An early preventive intervention for depressed mothers and their infants, its efficacy and predictors of maternal sensitivity

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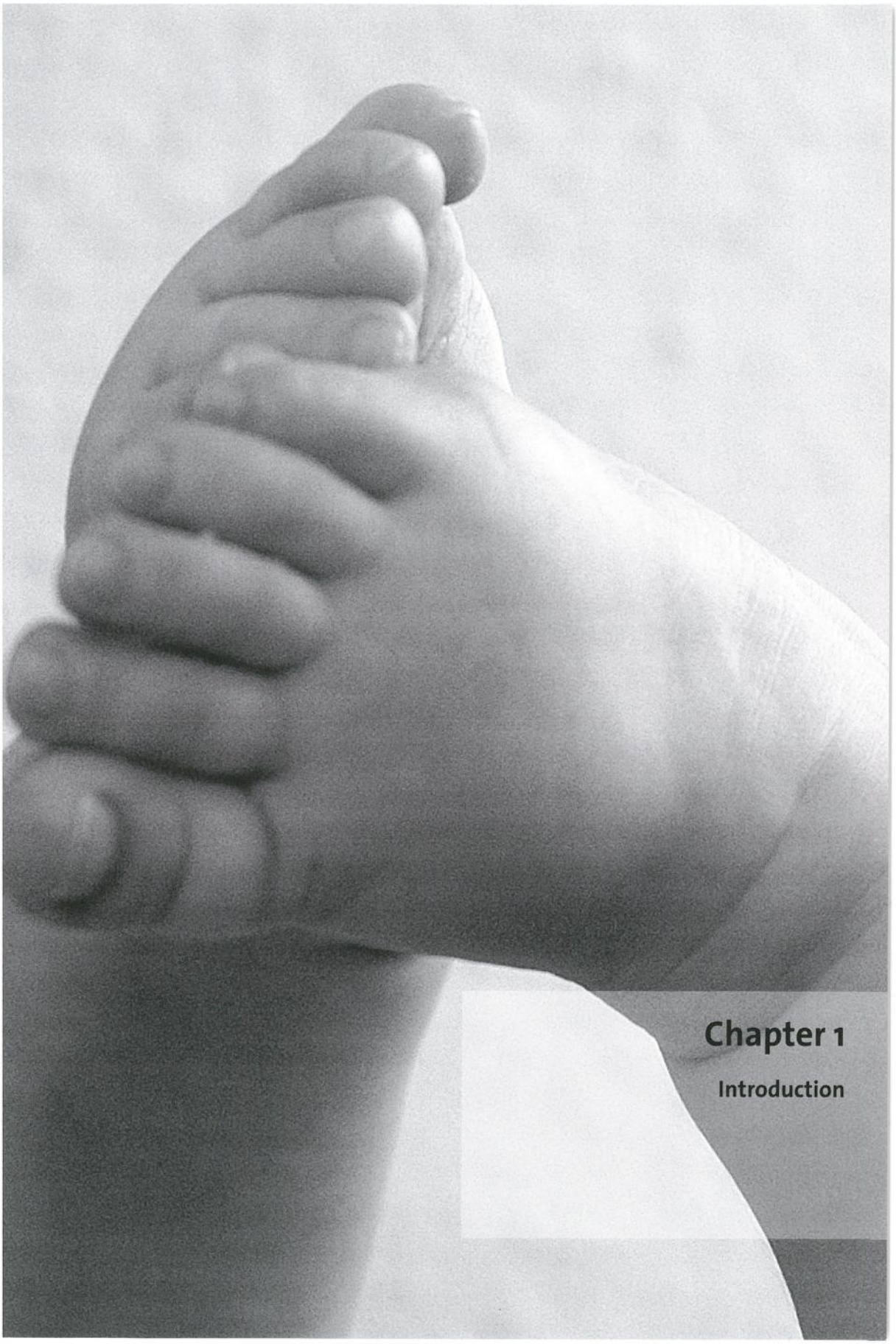

Chapter 1

Introduction

Many studies have shown that infants of depressed mothers are at risk for developing psychopathology, and that women of childbearing age are particularly at risk of depression (Kessler, McGonagle, Nelson & Hughes, 1994). The prevalence of clinical depression in the postpartum period is estimated at 8 to15% (Cox, Connor & Kendell, 1982; Cutrona, 1983; Gotlib, & Whiffen, 1989; O'Hara, Zekoski, Philipps, & Wright, 1990). Maternal depression has been found to negatively affect children's social, behavioural, emotional and cognitive development (Goodman & Gotlib, 1999; Murray & Cooper, 1997). It has been found that some infants of depressed mothers may already exhibit behavioural, physiological and biochemical deregulations shortly after birth (Field, 1998). In the course of the first year, many of these children are found to show heightened levels of distress, negativity and avoidance of the mother (Gelfand & Teti, 1990; Murray & Cooper, 1996). In general, as many as 40% of children of depressed parents develop a depressive episode themselves before they are 18 years old (Beardslee et al., 1993). There is extensive evidence to show that parental mental disorder is one of the major known risk factors for the onset of psychopathology in the population.

Since 1989, prevention experts and mental health workers in the Netherlands have been developing a national multi-component prevention programme to reduce the risk of psychiatric disorders and social problems in children of parents with a mental disorder, the so-called KOPP[1] programme, (Dhondt, Van Doesum & Zonneveld, 1989; Van Doesum, Frazer & Dhondt, 1995; Van Doesum & Weikamp, 2005, Beardslee, Hosman, Van Doesum, Solauntus & Cowling, in press). Currently, this programme is being implemented in all Dutch community mental health centres It is theory-based and focuses on reducing risk factors that threaten the mental health and development of this particular group of children, and on strengthening the protective factors that are beneficial to mental health and development. The programme includes various interventions aimed at children of different age groups, their mentally ill parents and other key persons in their social network. The interventions comprise multiple methods such as support groups for the children, psycho-educational courses for the parents, family intervention and education, training mental health workers and educating the public (Van Doesum, et al., 1995; Van Doesum & Weikamp, 2005).

The KOPP programme is aimed at parents with various kinds of mental disorders, their families and children between the ages of 0 and 21 years. In 1994, a national collaborative network of prevention experts was established, focusing on children of mentally ill parents. The network, coordinated by the Trimbos Institute (Netherlands Institute of Mental Health and Addiction), constitutes an important organizational instrument in supporting local prevention experts in community

[1] *Dutch abbreviation for children of parents with mentally illness, Australian abbreviation: COPMI*

mental health centres all over the country through training, exchanging educational materials, developing new intervention methods and promoting research. There has been considerable international interest in this Dutch prevention programme for children of mentally ill parents, with professionals groups from several European countries visiting the KOPP programme in preparation for implementing programme elements in their own countries. Dutch prevention experts have been invited to present the KOPP programme at national and international conferences in various countries and to train local mental health professionals. At the request of foreign experts, several interventions and materials from the Dutch programme have now been translated into other languages (English, Norwegian, Swedish) (Beardslee, Hosman, Van Doesum, Solauntus & Cowling, in press).

The last decade has seen a rapidly emerging interest in preventive interventions for children and families of mentally ill parents across Europe. This has resulted in several European conferences on this subject and growing international collaboration, sharing knowledge, expertise and materials. These European developments have been significantly supported by one of the American pioneers in this field, Professor William Beardslee (Beardslee & Wheeloc, 1994; Beardslee, Gladstone, Wright & Cooper, 2003; Beardslee, Wright, Gladstone, & Forbes, in press).

Until a decade ago, the KOPP programme was exclusively targeted at families of parents with mental disorders and children between the ages of 4 and 21 years. Preventive interventions for children under the age of five were lacking and there was an urgent need to fill this gap (Brok & Van Doesum, 1998). This has resulted in the development and assessment of a new mother-baby intervention, which was initiated in 1999 and is reported on in this thesis.

Growing evidence has shown that parent-child interactions especially during this early period have a strong impact on the development of children's resilience and psychiatric vulnerability. Although early onset major depression is familial and has a genetic component, environmental factors, poor quality of parent-child interaction and disrupted parent-child attachment may mediate the impact of parental depression (Cicchetti, Rogosh and Toth, 1998; Lyons-Ruth, Bronfman and Parsons, 1999). This was an important reason for me and my colleague Carla Brok, to develop the present preventive intervention for depressed mothers and their infants as part of the KOPP programme. The mother-baby intervention aims to improve the quality of the interaction between depressed mothers and their infants and to promote a secure attachment relation in order to prevent developmental problems in the children. It is the first preventive intervention in the Netherlands specifically aimed at depressed mothers and their infant(s) and is currently being implemented by approximately 50% of the Dutch mental health

care centres. It is expected to be introduced in other centres in the near future as part of the comprehensive national programme for children of mentally ill parents. The current thesis presents the mother-baby intervention and its scientific basis, as well as the results of a randomized controlled study on its effect on depressed mothers and their infants.

The main aims of this thesis are:

1. to describe and present a scientific framework for an early intervention for depressed mothers and infants developed by researchers and practitioners;
2. to discuss which maternal and contextual characteristics can predict the level of maternal sensitivity in depressed mothers with infants;
3. to examine the effects of the mother-baby intervention on the quality of the mother-child interaction and the child's attachment security and socio-emotional functioning, using a randomized controlled design;
4. to explore the predictive value of pre-intervention participant characteristics for the change in maternal sensitivity over time among depressed mothers and their infants.

Outline of the thesis

The present thesis comprises one theoretical study and three empirical studies, which are described in four chapters. The empirical studies are based on a data set, obtained from a sample of depressed mothers and their infants aged between 1 and 12 months (n = 84 at pre-test and n=71 at post-test and follow-up test), who participated in the randomized controlled study. As a consequence, there is considerable overlap in the Method sections of the empirical chapters. The next few paragraphs offer an outline of the data collection procedure. For a more detailed description of the sample, the procedure and the measures, the reader is referred to the individual studies.

The data were collected at three moments, namely before the intervention, immediately after the intervention and six months after the intervention, all during home assessments. The randomized controlled study was designed in such a way that, after the pre-test assessment, the participants were randomly assigned to the intervention group (receiving the mother-baby intervention) or the control group (receiving pedagogical support by phone). Table 1 summarizes the study variables and the method of data collection.

After the present introductory chapter, *Chapter 2* describes the theoretical framework underlying the development of the mother-baby intervention for depressed mothers and infants. Next, *Chapter 3* examines how various maternal, child and contextual characteristics, as well as the number of risk factors, are related to the sensitivity of depressed mothers towards their infants.

Table 1 Assessment procedure and measures at the three time points

Time	Variable	Measurement instrument
Pre-test (t1)		*Obtained from the mother:*
	Demographic information, birth weight and perinatal complications	Questionnaire
	Level of depression	BDI (Beck, 1979)
	Social support	SSL (Van Sonderen, 1993)
	Experienced life-events and long-term difficulties	Recent life events and long-term difficulties questionnaire (De Jong et al., 1996).
	Feelings of parental incompetence	Parental competence scales (Engfer et al.,1987)
	Comorbidity and diagnose Axes I	Interview MINI (Overbeek et al., 1997)
		Obtained from mother and infant
	Quality of the mother-infant interaction (mother bathing infant)	Emotional Availability Scales (Biringen et al. 1998).
Post-test (t2)		*Obtained from the mother:*
	Demographic information	Questionnaire
	Level of depression	BDI (Beck, 1979)
	Social support	SSL (Van Sonderen, 1993)
	Experienced life-events and long-term difficulties	Recent life events and long-term difficulties questionnaire (De Jong et al., 1996).
	Feelings of parental incompetence	Parental competence scales (Engfer et al., 1987)
		Obtained from mother and infant
	Quality of the mother-infant interaction (during free play)	Emotional Availability Scales (Biringen et al. 1998).
Follow-up test (t3)		*Obtained from the mother:*
	Demographic information	Questionnaire
	Level of depression	BDI (Beck, 1979)
	Social support	SSL (Van Sonderen, 1993)
	Experienced life-events and long-term difficulties	Recent life events and long-term difficulties questionnaire (De Jong et al., 1996).
	Feelings of parental incompetence	Parental competence scales Engfer et al. (1987)
	Infant socio-emotional functioning	Infant Toddler Social and Emotional Assessment (ITSEA, Carter et al. 2003)
		Obtained from mother and infant
	Quality of the mother-infant interaction (during free play)	Observation: Emotional Availability Scales (Biringen et al. 1998).
		Obtained by the researcher
	Child attachment security	Attachment Q-set (Waters, 1995)

Chapter 4 discusses the results of the randomized trial on the early home-visit intervention for depressed mothers, and *Chapter 5* focuses on predicting the change in maternal sensitivity over time in depressed mothers and infants and the identification of possible moderators of the intervention's efficacy. Finally, the last chapter *(Chapter 6)* summarizes the study and discusses the implications of the results, both from a scientific perspective and in terms of their relevance for prevention practice.

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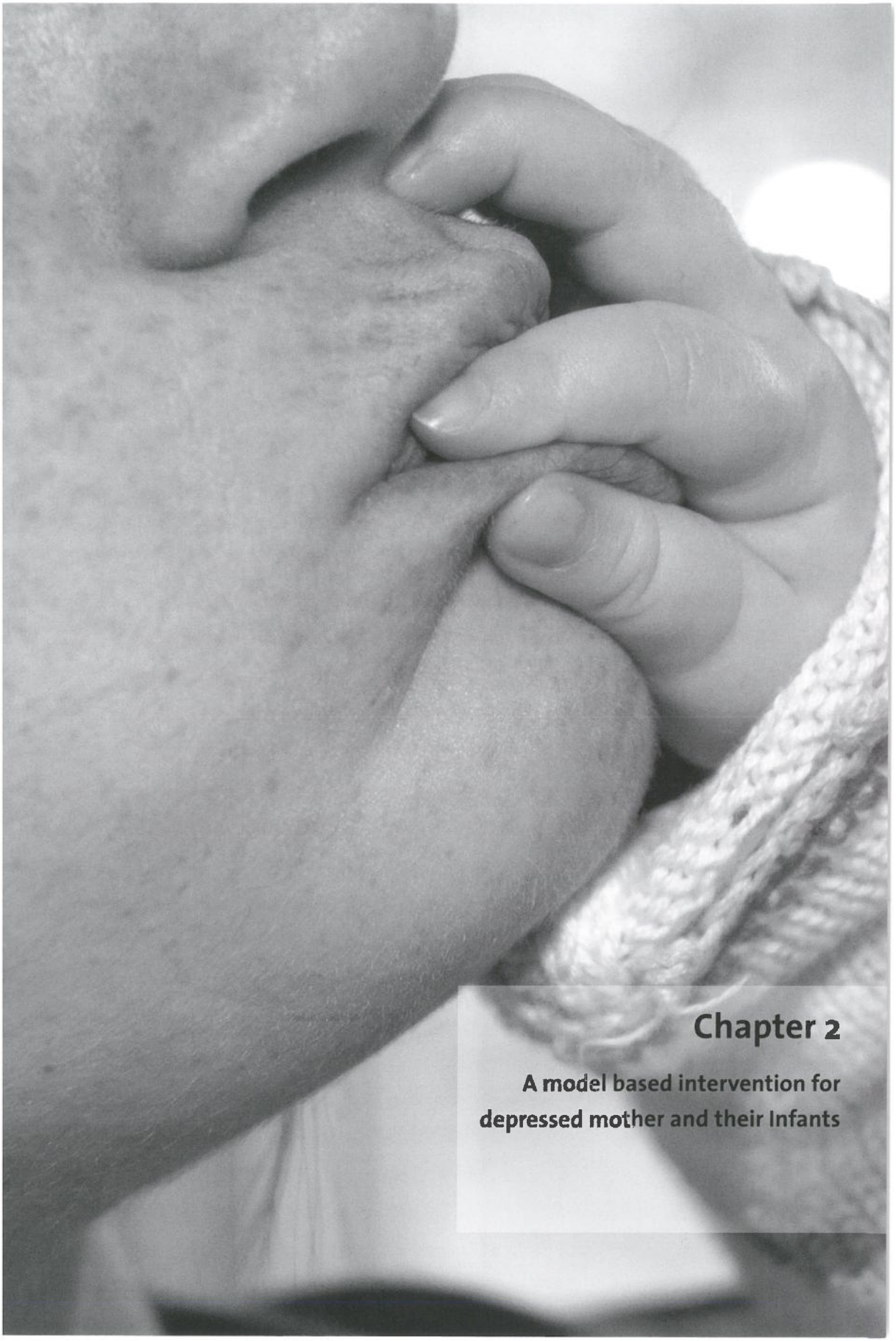


Chapter 2

A model based intervention for depressed mother and their Infants

This chapter was published as: Van Doesum, K. T. M., Hosman, C. M. H., & Riksen-Walraven, J. M. (2005). A model based intervention for depressed mothers and their infants. *Infant Mental Health Journal, 26* (2), 157-176.

Many studies have reported on the adverse effects of maternal depression on offspring. Infants of depressed mothers are found to be more likely at risk to develop mental and social-emotional problems. In this study, an early intervention programme is presented that aims to improve the interaction between depressed mothers and their infants in order to prevent developmental problems in the children. The intervention has recently been introduced in the Dutch Community Mental Health Centres as part of a national multi-component programme to reduce the risk of psychiatric and social problems in the offspring of parents with a mental disorder. The intervention for depressed mothers with babies is based on a transactional model in which the mother-child interaction plays a key role in explaining the development of socio-emotional problems in the children. The model as discussed in the first part of this article addresses a range of evidenced-based parental, child and contextual risk factors that affect the quality of the interactions between depressed mothers and their infants and that contribute to both vulnerability and resilience of the children during later childhood and adolescence.

2.1 Introduction

Children of mentally ill parents constitute one of the most important risk groups in psychopathology. Several longitudinal studies have shown that the risk of developing mental disorders and serious social-emotional problems among these children range from 41 to 77% (Goodman, Adamson, Riniti, & Cole, 1994, Beardslee et al., 1993; Downey & Coyne, 1990; Orchavel, Walsh-Ellis, & Ye, 1988; Weissman et al., 1987; Rutter & Quinton, 1984). Over the past 15 years, prevention experts and mental health professionals in the Netherlands have been developing a national multi-component prevention programme to reduce the risk of psychiatric disorders and social problems in children of parents with a mental disorder (Van Doesum, Frazer, & Dhondt, 1995). Currently, this programme is implemented in most of the Dutch community mental health centres as one of the regular services offered by the prevention teams that are present in all of such centres. It is theory-based and focuses on reducing risks and strengthening protective factors in the development of mental disorders in this particular group of children. The programme includes multiple interventions and addresses children of different age groups, their parents and other key persons in their social network. The interventions comprise multiple techniques such as support groups for the children, psycho-educational courses for the parents, family intervention early treatment of the parent and early screening of the children, training of professionals and the dissemination of educational materials (e.g. brochures and videotapes) (Van Doesum et al., 1995; Van Doesum, 2001).

Up to now, the Dutch prevention programme has targeted families of parents with various kinds of mental disorders and children between the ages of 4 and 21 years. Preventive programmes for children for the under fives are still lacking. There is an urgent need to fill in this gap, while growing evidence shows that especially during this early period, parent-child interactions have a strong impact on the development of children's resilience and psychiatric vulnerability. In the Netherlands, effective preventive interventions have been developed for various categories of infants at risk of developmental delays or problems, such as for infants of lower educated mothers (9-12 months old, Riksen-Walraven, 1978), irritable infants of mothers with a low socio-economic status (6-9 months old, Van den Boom, 1994), infants from ethnic minority groups (13-18 months old, Riksen-Walraven, Meij, Hubbard, & Zevalkink, 1996), and adopted infants (6-12 months old, Juffer, Hoksbergen, Riksen-Walraven, & Kohnstamm, 1997). Intervention programmes for infants of parents with a mental illness, however, have as yet been lacking in the Netherlands. The intervention programme that will be presented and discussed below, has recently been introduced in the Dutch Community Mental Health Centres and is the first programme specifically aimed at depressed mothers and their infant(s). First, we start this paper with discussing the theoretical and empirical foundation of the programme.

2.2 Effects of maternal depression on child development

Women of childbearing age are particularly at risk of depression (Kessler, McGornagle Nelson, & Hughes, 1994). The prevalence of clinical depression in the postpartum period is estimated at 8 to 15% (Cox, Connor, & Kendell, 1982; Cutrona, 1983; Gotlib, & Whiffen,1989; O'Hara, Zekoski, Philipps, & Wright, 1990). Many studies have reported on the adverse effects the mother's depression has on her offspring. It has been shown that some infants of depressed mothers may already exhibit behavioural, physiological and biochemical deregulations shortly after birth (Field, 1998). In the course of the first year , many of these children are found to have heightened levels of distress, negativity and avoidance of the mother (Gelfand & Teti, 1990; Murray & Cooper, 1996). They exhibit little positive and much negative affect, which gives them a depressed appearance, in some instances already at three months of age (Cohn, Campbell, Matias, & Hopkins, 1990; Field et al., 1988). In one- and two-year-old children, maternal depression has been found to be associated with impaired socio-emotional and cognitive development (Murray & Cooper, 1996). Infants of depressed mothers are more likely to be less sociable and more fearful of strangers. They may have lower frustration tolerance, tend to have more behavioural problems such as sleeping and eating problems, temper tantrums, separation difficulties and are more often insecurely attached (Cicchetti,

Rogosch, & Toth, 1998). In addition, their cognitive development as assessed by various standardized tests proves to be delayed. Particularly sons of depressed mothers are found to perform poorly (Murray & Cooper, 1996; Sugawara, Kitamura, Toda, & Shima, 1999). Two-year-old children of depressed mothers are more likely to show a delay in expressive language development as compared to children of non-depressed mothers (Cox, Puckering, Pound, & Mills, 1987). Eleven-year-old children whose mothers suffered from postnatal depression at three months postpartum appeared to have significantly lower IQ-scores and poorer school performance than children of non-depressed mothers (Hay et al., 2001).

Children of depressed parents have an increased risk of developing a major depressive disorder in childhood and adolescence as well as anxiety disorders and alcohol dependency in adolescence and early adulthood (Weissman, Warner, Wickramaratne, Moreau, & Olfson, 1997). As many as 50% of the children of parents with serious affective disorders will have experienced an episode of depression by the end of their adolescence (Beardslee & Wheeloc, 1994; Downey & Coyne, 1990; Goodman & Emory, 1992).

Over the years, three mechanisms have been proposed to help explain the effects of maternal depression on child outcomes: early mother-child interaction, prenatal neurobiological transmission, and the genetic mechanism of transfer. Clinical and systematic observations suggest that maternal depression negatively affects the quality of the mother-child interaction (Cummings & Davies, 1994; Field, 1998; Hammen, 1991; Murray & Cooper, 1997a; Rutter & Quinton, 1984). Further in this paper early mother-child interaction will be described in detail as a key element in the proposed theoretical model and intervention. The second mechanism that is proposed to mediate the effects of maternal depression on children is prenatal neurobiological transmission. There is some evidence that depressed women have abnormal neuroendocrine functioning during pregnancy, which is associated with impaired blood flow to the placenta and also causes the fetus to be exposed to increased levels of cortisol. Foetuses of depressed mothers have been found to be characterized by relatively slow growth and little movement. Also, an unhealthy lifestyle of the mother, increased levels of stress, smoking and use of alcohol might contribute to a less-than optimal intrauterine environment (Dawson et al., 1999; Field, 1998; Goodman & Gotlib, 1999). The third mechanism that might explain the relationship between maternal depression and child disorders is the genetic transmission of depression. There is a substantial genetic contribution to depression in adults. Studies investigating twins and adopted children have provided evidence of genetically based risks. The risk of an affective disorder in first-degree adult relatives of a patient with unipolar affective disorders is estimated at 20 to 25%, compared to the general population risk of 7% (Nolen-Hoeksema, 1987;

Tsuang & Faraone, 1990; Weismann, Fendrich Warner, & Wickramaratne, 1992). The genetic contribution to depression in adults appears to be greater for depression that meets the DSM VI criteria than for depression that is measured solely by scores on symptom checklists. In addition, offspring of mothers who experience an early onset of their depression may carry a higher heritability for depression than do children whose mothers' depression occurs later in life (Weissman, Warner, Wickramartne, & Prusoff, 1988). Although the genetic contribution to the transmission of depressive disorders may be sizeable, it is likely to only partly account for the emotional and behavioural disturbances found in the children of depressed mothers (Goodman & Gotlib, 1999).

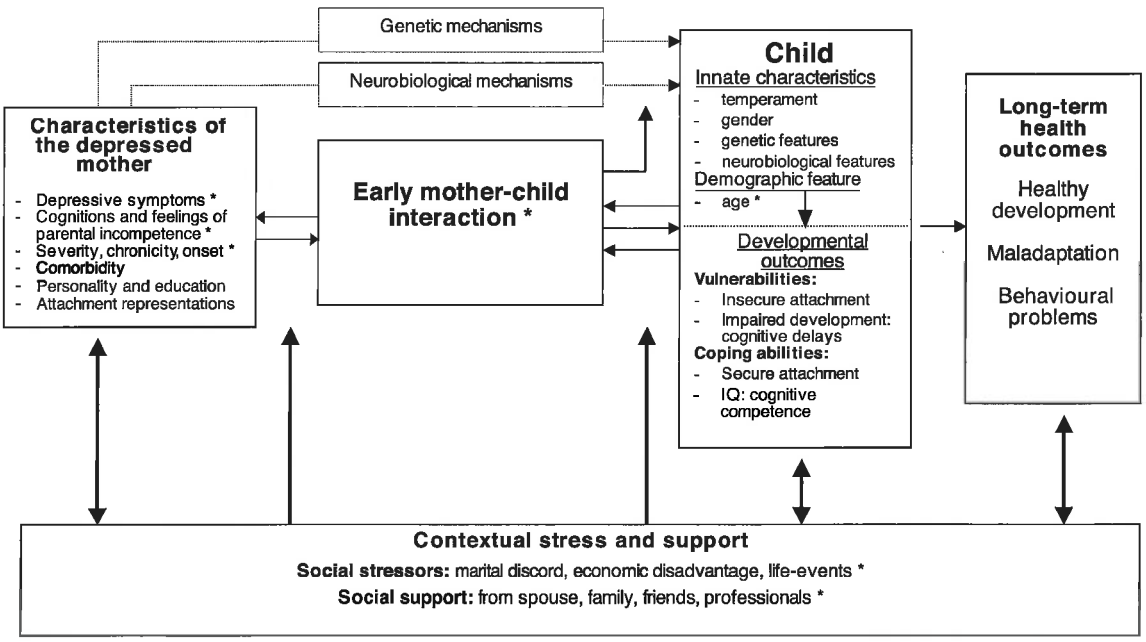
2.3 Towards a transactional model of the early development of disorders in children of depressed mothers

Although maternal depression has been found to be associated with negative developmental outcomes in offspring, the children are not all equally at risk of developing psychiatric problems. In Figure 1 we present a model that highlights the factors and mechanisms that are assumed to raise this risk. The model includes the above-mentioned three mechanisms of transmission and focuses especially on the early mother-child interaction. The latter mechanism has been awarded a central role in the model because it is considered a main route through which maternal depression affects short- and long-term development outcomes in children and because mother-infant interactions in general have been found sensitive to preventive interventions (e.g. Van den Boom, 1994, Juffer et al., 1997). Mother-infant interaction in depressed mothers differs in various aspects from the mother-infant interaction in non-depressed mothers. During the interactions with their infants, depressed mothers tend to express fewer emotions and show more sad affect than non- depressed mothers. In addition, they are more intrusive, less involved, less responsive and less sensitive to the infant's signals, as is illustrated by their reduced ability to discriminate small differences in infant cries (Donovan, Leavitt, & Walsh, 1998). One of the most striking features of the interactions between depressed mothers and their infants is the mothers' silence; depressed mothers speak less to their children and when they do, they usually talk in a quiet voice As compared to non-depressed mothers, depressed mothers show more covert as well as overt hostility such as anger, criticism and irritability toward their children (Goodman et al., 1994; Cohn et al., 1990; Donovan et al., 1998, Downey & Coyne, 1990; Field, Healy, Goldstein, & Gutherz, 1990; Hops et al., 1987; Radke-Yarrow, Nottelmann, Martinez, Fox & Belmont, 1992). Furthermore, depressed mothers have been characterized by ineffectiveness in resolving conflicts and by their tendency to alternate between harsh, punitive discipline and lack of structuring (Dumas, Gibson, & Albin 1989;

Kochanska, Kuczynski, Radke-Yarrow, & Welsh, 1987; Murray, Fiory-Cowley, Hooper, & Cooper, 1996).

Two processes involved in the early mother-child relationship might account for the transmission of disorders from mother to child. First, the child's imitation of the mother's depressed affect and behaviour may play a role. According to Field (1995), the mutual imitation that occurs between mother and child during the early interactions contributes to the depressed mood style in the children. Children may also develop externalizing disorders through modeling processes, i.e. by imitating the hostile and irritable behaviours of the depressed parent (Downey & Coyne, 1990; Field, 1995). The second process operative in the interaction between depressed mothers and their infants is a lack of attunement at the behavioural level. When a mother is affectively unresponsive and emotionally unavailable, her infant is likely to exhibit behavioural disorganization, avoidance, and lack of positive affect, which in turn has a negative effect on maternal behaviour (Tronick & Weinberg, 1997). The link between a disturbed mother-child interaction and negative developmental outcomes in children may be explained in part by an insecure mother-infant attachment (Cicchetti et al., 1998). Children of depressed

Figure 1 Transactional model of the early development and behavioural emotional disorders in children of depressed mothers



* Risk factors and mechanisms addressed or taken into account in the KOPP mother-baby program

mothers have been found at risk of insecure attachment (Radke-Yarrow, Cummings, Kuczynski, & Chapman, 1985; Zahn-Waxler, Cummings, Iannotti, & Radke-Yarrow, 1984; Field,1989; Spieker & Booth, 1988) and insecure attachment, in its turn, has been associated with socio-emotional and behavioural problems in childhood and adolescence (Carlson & Sroufe, 1995). Compared to their peers with secure attachment patterns, insecure infants function less well in a variety of domains during toddlerhood as well as during their preschool and early school years. For example, they have been found less effective in interpersonal relations and less successful in their efforts to master challenging tasks (Carlson & Sroufe, 1995). At age 14, securely attached children are reported to have better coping skills and to be more self-confident, less dependent, and better able to make friends as compared to their insecure counterparts (Elicker, Englund, & Sroufe, 1992). Thus, the insecure infant-mother attachment associated with maternal depression can be said to be an evident risk factor for the child's later development.

In various studies the early mother-child interaction has been found to be the most crucial mechanism in explaining the effect of maternal depression on child outcomes (Field, 1995; Tronick & Weinberg, 1997). To explain the relatively long-term effects it has been suggested that a deregulated mother-infant interaction might impair brain development in infants. This implicates an enduring vulnerability to later disorder (Schore, 1996, 2001a, 2001b). Infants of depressed mothers exhibit reduced left frontal brain activity, which is suggested to be related to lower levels of affection towards the mother and higher levels of negative affect, hostility, tantrums and aggression (Dawson et al., 1999). These findings may thus also explain why the impact on the children continues after remission of the mother's depression.

The model depicted in Figure 1 distinguishes three groups of risk factors that have been assumed and found to independently contribute to the quality of the parent-infant interaction: parental characteristics, child characteristics and contextual sources of stress and support (Belsky, 1984; Van Bakel & Riksen-Walraven, 2002). The model is transactional in that the development of the child is seen as the product of the continuous dynamic interactions (i.e., the 'transactions') between the child and its immediate and more distal context (see also Sameroff & Fiese, 2000). As can be seen from the diagram, the characteristics of the depressed mother are assumed to affect the child through the mother-child interaction.

Characteristics of the depressed mother

Various characteristics of depressed mothers may be assumed to negatively affect the quality of the everyday interactions with their infants. Such characteristics include negative cognitions, behavioural symptoms of depression and time of onset, severity, chronicity, and comorbidity of the depression.

Depressive symptoms, negative cognitions and behaviour. The main symptoms of depression are depressed mood, low self-esteem, low activity level and a negative way of thinking. Depressive symptoms of the mother have been related to a disturbed mother-child interaction and feelings of parental incompetence Depressed mothers have little confidence in the way they fulfil their caregiver role and report a lower sense of self-efficacy (Downey & Coyne, 1990; Field, 1992; Gelfand & Teti, 1990; Goodman & Emory, 1992; Kochanska, Radke-Yarrow, Kuczynski & Friedman, 1987). Low maternal self-efficacy, in turn, has been observed to be negatively related to the mother's actual parenting behaviourr (Riksen-Walraven et al., 1996; Teti & Gelfand, 1991).

Severity and chronicity of depression. Other substantial risk factors are the severity and the chronicity of the depression. Postpartum depression can last 3 months up to 1 year. This does not differ much from durations of depression that occur at other times. Depression is a typical recurrent disorder with over 80% of depressed patients experiencing more than one depressive episode 50% relapses in two years and 70% in 5 years (Mueller et al., 1996: Belsher & Costello, 1988; Keller, 1988). Studies on the offspring of parents suffering from various types of psychopathology showed that it is the persistence of the disorder and its severity rather than the diagnostic specificity that predicts significant impairment and higher rates of psychopathology in children (Beardslee, Schultz, & Selman, 1987; Hammen, 1991; Keller et al., 1986; Murray, Sinclair, Cooper, Ducournau & Turner, 1999; Rutter & Quinton, 1984).

Comorbidity. Comorbidity in parents has been shown to increase the risk of mental disorders in their offspring, such as comorbidity of major depression and panic disorder or agoraphobia and comorbidity of parental depression and personality disorder (Downey & Coyne, 1990; Merikangas, Weissman, Prusoff, & John, 1988; Weissman, Leckman, & Merikangas, 1984). In the study by Shea, Glass, Pilkonis, Watkins, and Docherty (1987), 35% of the patients with a major depression proved to have a personality disorder as well This type of comorbidity has been found to be associated with onset at a younger age, more hospitalizations and longer episodes, a family history of alcoholism and antisocial personality disorders and a poorer recovery at hospital discharge (Black, Bell, Hulbert, & Nasrallah, 1988). Mothers with comorbid diagnoses are reported to show lower quality interactions with their infants and to have infants with higher levels of insecurity than either mothers with depression or healthy mothers (Carter, Garrity-Rokous, Chazan-Cohen, Little, & Briggs-Gowan, 2001).

Other maternal characteristics. Other maternal characteristics that have been found to contribute to the quality of the mother-child interaction are maternal personality, particularly ego-resilience, education, and maternal attachment representations (Crandell, Fitzgerald & Whipple, 1997; Cummings, & Davies, 1994; Murray & Cooper, 1997a; Pederson, Gleason, Moran, & Bento, 1998; Van Bakel & Riksen-Walraven, 2002; Van IJzendoorn, 1995). In empirical studies on depressed mothers and their infants these characteristics have, so far, received relatively little attention.

Child characteristics

In addition to the age of the child, four groups of innate child characteristics are assumed to affect the mother-child interaction and the vulnerability of children of depressed mothers to develop social, emotional and behavioural problems in the long term: temperament, gender, genetic factors and neuro-biological features.

Temperament. In studies with samples of normal, healthy children, various child temperament characteristics have been shown to be related to the quality of the parent-child interaction. Children with an easy temperament appear to be less vulnerable, particularly when compared to children with difficult temperamental features, who are more likely to be drawn into a maladaptive pattern of parent-child interaction (Lee & Bates, 1985; Maccoby, Snow, & Jacklin, 1984; Peters-Martin & Wachs, 1984; Rutter & Quinton, 1984: Whiffen and Gotlib, (1989b).

Gender. Outcomes of studies on the influence of gender on the development of children of depressed mothers are mixed. Most of the studies have not reported any gender difference, but among those that have found gender effects, boys are more often at higher risk (Murray, et al., 1996; Rutter & Quinton, 1984; Sharp et al., 1995).

Genetic and neurobiological factors. As shown by the dotted arrows in the model (see Figure 1), genetic and neurobiological mechanisms are assumed to be distinct and separate paths of influence of maternal depression on child development, independent of and supplementary to the mother-child interaction. Recent research shows the expression of genetic or neurobiological factors to depend on the quality of the social environment (Suomi, 2000). This interactive effect is indicated by the arrow from the mother-infant interaction to the relation between neurological and genetic mechanisms and child characteristics. The model further indicates that the children's genetic and neurobiological characteristics are assumed to affect child development both directly and indirectly by influencing the quality of the mother-infant interaction.

Age of the child. Many studies indicate that an onset of parental disorder occurring early in the child's life increases the risk of psychopathology (Field et al., 1988; Shachnow, 1987; Weissman et al., 1988). Maternal depression is assumed to have a stronger and more negative impact when children are young (0–5 years) because maternal depression interferes with the development of the child's ability to regulate emotions and behaviours and to form secure attachments and healthy peer relations. In general, the older the child at the first exposure to the mothers' depression, the less vulnerable it proves to be to adverse influences, probably because of the greater maturity of its behavioural system (Goodman & Gotlib, 1999).

Contextual stress and support

Social stressors and social support have been found to be important contextual factors influencing parenting and child development (Belsky, 1984; Van Bakel & Riksen-Walraven, 2002). In the current model, the contextual factors are assumed to indirectly affect the quality of the mother-child interaction by influencing maternal characteristics and child development. In addition, they are assumed to moderate both the relationship between the maternal characteristics and the mother-child interaction and the connection between mother-child interaction and the child's developmental outcomes. For example, in families where the mother has an affective disorder, the father may play a key role (1) in supporting the mother within the marital relationship, (2) in her interactions with her child and (3) in supporting the child in its everyday interactions, particularly when the mother-child interaction is deficient.

Social stress includes life events such as marital discord, loss of health or job, death in the family, single parenthood, substance abuse, and socio-economic circumstances (e.g. poor housing, poverty,). There is ample evidence that all these factors play a role in the association between maternal depression and child development. In families with a depressed parent, these stressors are more common as compared to families with healthy parents (Billings & Moos, 1984; Downey & Coyne, 1990; Hammen, 1991, 1992; Webster-Stratton & Hammond, 1988).

Social support is important in that it enhances the ability to cope with social stress. The depressed mother may receive support from her spouse, family and friends as well as from professionals, but partner support appears to be the most influential. Partner support has been found to contribute independently to the quality of the mother-infant interaction (Van Bakel & Riksen-Walraven, 2002). The presence, availability and mental health of the father are important protective factors; a healthy father may compensate for the negative effects of maternal depression on the infant's interactions and is associated with a lower incidence of disorders among

school-aged children of depressed mothers (Conrad & Hammen, 1989; Hossain et al., 1994). Moreover, there is an association between lack of spousal support and increased levels of postpartum depression (Campbell, Cohn, Flanagan, Popper, & Meyers, 1992), which has an indirect effect on the mother-child interaction and child development. Unfortunately, children of a depressed mother are also likely to have a father with an emotional disturbance (Gotlib & Hammen, 1992). More than one third of the spouses of depressed patients are troubled by psychological complaints themselves and in need of professional help (Downey & Coyne, 1990). The role of relatives and other important persons in families with depressed mothers and infants has been examined only incidentally. The availability of family or friends, who are, for example, willing to take care of the child when necessary, can be a protective factor in the child's development (Rutter & Quinton, 1984).

2.4 The early intervention for depressed mothers and their babies

Origin and principles

The Dutch intervention for depressed mothers and their babies (mother-baby intervention) is developed on basis of the transactional model outlined above. The intervention focuses on the most important mechanism of transmission, i.e. the mother-child interaction, and on important risk factors in the mother (depressive symptoms, parental competence) and in the social context (support), while also taking into account an important child risk factor, namely age. The intervention is inspired by other early intervention programmes for depressed mothers and their babies (Gelfand, Teti, Seiner, & Jameson,1996; Field, 1998; Lyons Ruth, Connell, Grunebaum, & Botein, 1990,) and by successful early intervention programmes designed for various other types of families at risk in the Netherlands (Juffer et al., 1997; Riksen-Walraven, 1978; Riksen-Walraven et al., 1996; Van den Boom, 1994). From those programmes, elements were adopted that have been proven effective particularly in improving the mother-interaction, namely, interaction coaching tailored to the mother's interaction style, increasing the amount of touching (for example by baby-massage), and stimulating support from the (non-depressed) partner or other adults (Field, 2002).

With regard to the approach, the present mother-baby intervention does not differ too much from the early intervention programmes for depressed mothers and infants carried out in the USA (Gelfand et al., 1996; Field, 1998; Lyons-Ruth et al., 1990). The distinction can be found in the length of the intervention and its embedment in the Dutch mental health services. In addition as outlined in the introduction, it is part of a national comprehensive prevention programme for

children of mentally ill parents. Another difference with the earlier programmes lies in the cultural context. Mother-infant interaction in the USA has been found to differ from interaction in Dutch mother-infant dyads. At the age of six months, for example, Dutch infants have been found to receive significantly lower levels of stimulation and interaction by their mothers and to spend less time in a state of active alertness (vs. quiet alertness) during their waking hours as compared to their same-aged peers in the United States (Super et al., 1996). Basically, the intervention is assumed to be suitable for all depressed mothers and babies. However, depressed mothers with alcohol or drug addiction are excluded, as well as cases in which there are serious concerns of child abuse. The problems of these families are too serious for them to benefit from the presented intervention.

The six core principles of the intervention are:

1. *Early intervention*

   The empirical evidence on the relations between maternal depression and child development suggests that it is important for preventive interventions to take place at an early stage (Murray & Cooper, 1997b). Therefore, mothers are offered the intervention as early as possible. The intervention focuses on infants in the age range of 0 to 12 months.

2. *Improvement of the quality of the mother-child interaction*

   The mother-child interaction is expected to be the most malleable of the three transmission mechanisms included in the model and therefore most sensitive to preventive intervention early in the child's life. High quality mother-child interaction, particularly high sensitive responsiveness of the mother, promotes secure attachment and healthy development of the child. Sensitive responding to the infant can also lead to positive experiences for the mother, which in turn can result in a decrease of the depressive feelings.

3. *Early treatment of the depressed mother*

   The above evidence strongly suggests maternal depression to have a negative effect on the quality of the mother-infant interaction. Severe depression can obstruct mothers' ability to be open for changes in her interaction with the child. An effective and substantial, enduring improvement of the mother-child interaction can only be achieved if the interaction coaching of the mother is accompanied by treatment of her depression. A concurrent treatment for depression may therefore considerably contribute to the success of the preventive intervention and thus to a healthy development of the child. Cooper and Murray (1997) showed, however, that treatment of depressive symptoms

alone may not positively affect the mother-infant relationship. The recovery from depression did not automatically result in improvement of the mother-child interaction if the depression lasted more than six months (Weinberg & Tronick, 1998). Thus, although treatment of depression can be considered a necessary condition for the intervention to succeed, treatment alone is not sufficient to improve the mother-infant interaction, particularly in case of prolonged depression.

4 Improvement of social support

In the section on contextual stress and support it was shown that spouse support and the social network are significant protective factors. For this reason, the father is also invited to participate in the intervention to enhance the social support for the mother and to provide the child with an opportunity to interact with a healthy parent. In case of marital discord and parental relationship problems, this should be addressed in the mother's therapy or partner-relation therapy. The intervention also encourages the parents to expand their social network.

5. Additional mental health services

Such services are provided in case of multi-problem families. Treatment of the depression includes taking care of social stressors. The mother's therapist coordinates the additional services for the family, for example, a social worker for housing and financial problems and a psychiatric nurse to support the family at home. In the Netherlands, such services are paid by the national health insurance system. In case of no therapist involvement in the family, the general health practitioner can refer to the mother-baby-intervention team. In such cases, the team will motivate the mother to combine her participation in the intervention with individual treatment for her depression.

6. Home-visits

A home-visitor, in this case a prevention specialist of a Dutch Community Mental Health Center[2] with a college or university degree in psychology or social work, visits the depressed mother and her infant at home or, in exceptional cases, at the psychiatric department of a general hospital. On average, the intervention comprises 8 to 10 visits. Compared to similar intervention programmes developed in the USA (Gelfand et.al., 1996; Field, 1998; Lyons Ruth et al., 1990)

2 In the Netherlands each public health region has a Community Mental Health Centre and a Public Health Centre. All Mental Health Centres and Public Health Centres have a specialized team of prevention workers or health educators, the majority of whom have been academically trained and are specialized in preventive and health education.

our intervention includes less sessions. There are several reasons why a shorter duration of the intervention is thought to be sufficient in the Netherlands. First, the aim of the intervention is limited to improvement of the mother-child interaction. Unlike in other programmes, the present intervention does not serve further goals directly such as improving parental self-efficacy and education. Furthermore, the intervention is not focusing specifically on mothers at very high-risk, in contrast to the programmes of Field (teenage mothers, 1998) and Lyons Ruth et al. (low-income mothers, 1990). And, finally, Dutch parents with children 0 - 4 years old receive standard support of health nurses from child guidance service. This is a nationwide public health service offering vaccinations, developmental screening, and pedagogic advice for parents with young children. During the home-visits the prevention specialist uses various methods to foster the mother-child interaction, as will be described below.

The intervention in detail

First contact and introduction. At the community mental health centre, the therapist treating the depressed mother draws her attention to the availability of our supporting service and introduces her to the mother-baby intervention. If she agrees to participate, a home-visitor is assigned to her case and contacts the family to make an appointment for the first session. In addition, referral to the intervention is possible by general practitioners and by district nurses, and mothers may present themselves for the intervention in response to advertisements in local media. The prevention teams of the community mental health centres are in charge of recruitment, coordination, and implementation of the mother-baby intervention in close collaboration with the therapist of the mother.

The first home-visit: Meeting the parent(s). During this introductory session the home-visitor explains the aim of the intervention, during which he or she makes preliminary observations of the mother-child interaction. Fathers – who are asked to be present during thre session – are encouraged to also participate in the intervention. After the parents have agreed to join the intervention, and following the mother's consent, the bathing of her baby is recorded on videotape. Bathing is preferred for the first record because it is a daily activity for most of the mothers and infants, in contrast to other interactive situations such as mother-infant play. Moreover, bathing gives a good impression of the mother's sensitivity to both positive and negative signals of the infant, given that many infants cry when undressed or taken out of the bath.

Determining the intervention strategy. A multi-disciplinary team (specialists in infant mental health care and adult psychopathology of the community mental health centre) analyses the videotape on the basis of two scales for rating qualities of the mother-child interaction, i.e. sensitivity versus insensitivity and cooperation versus interference (Ainsworth, Bell & Stayton, 1974). According to the concept of sensitivity as proposed by Ainsworth, the response process consists of four stages. The mother has to perceive the infant's signal, interpret it correctly, select an appropriate response from her repertoire and implement it effectively. Insensitivity could be the result of a deficiency in any of these stages of the perception-response sequences. Observation can make clear which of these stages deserve extra attention (see also Van den Boom, 1988). Accordingly, based on the analysis of the video observations and the experiences of the home visitor during the first visit, the team defines the aims for the intervention, which may, for instance, entail improving the mother's sensitivity or reducing the mother's interference. Subsequently, the home-visitor chooses the method(s) best suited to achieve these goals and fine-tunes the intervention to the mother's needs.

Implementation of the intervention. The intervention is carried out during 6-8 home-visits, each lasting about 60 - 90 minutes. In the beginning visits are weekly, but later on the frequency decreases to one visit every two weeks. In total, the implementation lasts 3-4 months from the first contact through the last home-visit. Because the intervention is tailored to the individual mothers and their context, there is no standard programme for the home-visits. Video-feedback is used as the core intervention method, under the condition of parental consent. The method is similar to the video interaction guidance treatment of Susan McDonough which is developed for difficult-to-engage and overburdened families (1995, 2000). Our intervention, however, is not based on her work. During each home-visit the prevention specialist monitors and videotapes mother and child during everyday activities, such as bathing or feeding the baby. Subsequently, while watching the tapes together, the home-visitor discusses the interactions with both parents. The mother is encouraged to expand her range of appropriate communicative behaviours using the videotapes to show her when to respond to the baby's eye-contact, movements, or sounds. For example, one tape showed a lack of eye-contact between mother and infant. While inspecting the tape, the mother told that her child was not interested in her, but instead always looked at his dad. But the tape also showed some instances of the child looking at his mother, which she did not notice. When the images of such moments are enlarged for a mother, she will mostly recognize that the child is trying to make contact. This makes her aware of possible contact opportunities. Subsequently, the mother is asked

to practice and try to respond to the child's contact initiatives. The father, when present, is encouraged to support his wife in her interaction with her child. Hossain et al (1994) found that nondepressed fathers had more positive interactions with their infants than did their depressed wives. In case the father takes over too much over the interactions with the infant – which might strengthen the mother's feelings of incompetence as a parent – this is also discussed.
In addition to the video observations, also one or more of the following techniques are used, depending on the needs of the parents:

Modeling. The mother is further supported in her parenting role by having her adopt new interactive techniques by means of modeling. The home-visitor demonstrates how the mother can use various techniques to respond to the infant's contact initiatives. For example, the home visitor shows how imitating the infant's sounds or facial expressions elicits the child's attention and excitement. The mother is encouraged to do the same and thereby experiences the reinforcement of her infant's positive response.

Cognitive restructuring. The home-visitor encourages the mother to try and change her negative way of thinking about the child and her competence as a parent. By using techniques also used in cognitive behaviour therapy it is explained to her that negative thinking can maintain her depressive feelings towards herself and her infant. For example, one of the mothers told the home-visitor her 6-months-old son was afraid of her. When she came into his bedroom, he extended his hands to her while fussing or crying, which she interpreted as a sign of anxiety or resistance. Having noticed the mother's negative interpretation of the child's signals, the home-visitor supported her to label the child's behaviour in a more appropriate and positive way.

Practical pedagogical support. The home-visitor provides the mother with information on how to deal with the baby's crying, sleeping and eating problems.

Baby-massage. This massaging technique often introduced during modeling aims to improve the quality of the physical contact between the mother and her infant. It encourages her to touch her child more tenderly and it will help her make her baby feel more comfortable (Field, 1995). In the Netherlands, baby-massage courses are offered by the infant health care centres. Mothers are encouraged by the home-visitor to participate in these courses.

In the remainder of the sessions the parents are given the opportunity to familiarize themselves with these newly acquired patterns of positive interaction. Through practice the mothers and fathers learn to adopt new and more sensitive interactive behaviours. In the last visit, a plan is made with instructions that will help the parents to sustain the positive interactions in the future.

Follow-up visit. Three months after the last home-visit the prevention worker visits the family once again to observe the mother-child interaction and to see whether the progress that has been made during the intervention has been preserved. Any problems or questions the parents may have are discussed and, if needed, additional advice or counseling is offered.

2.5 Conclusion and discussion

Worldwide, there is a growing demand for preventive interventions for depressed mothers and their infants (Field, 1995; Gelfand & Teti, 1990; Lyons-Ruth et al., 1990). These infants represent a population at high risk for transgenerational transfer of psychopathology. The transactional model that was introduced in the present article constitutes the foundation of such a preventive intervention programme. The mother-baby intervention comprises an early preventive intervention specifically targeting depressed mothers with infants in the age range between 0 and 12 months. The intervention focuses primarily on the interactive processes between mother and child and on the improvement of parenting skills. The intervention is currently being implemented by 50 % of the mental health care centres in the Netherlands and will be introduced in other centres in the near future as a part of a comprehensive national programme for children of mentally ill parents. Other European countries have already expressed their interest in implementing the intervention and receive professional training by our team.

Our experience in clinical practice suggests positive effects on both mothers and infants. However, controlled intervention studies including longitudinal follow-up are certainly needed to confirm these observations. In addition, it should be kept in mind that not all depressed mothers and infants may benefit from of the intervention. First, the intervention is intended for mothers with very young infants. For mothers with older infants, more home-visits may be needed because negative mother-child interaction patterns – with avoidance and negativity on the part of the infant- may stabilize and become increasingly difficult to change. Secondly, special attention should be given to mothers with a personality disorder - particularly borderline personality disorder- as comorbidity of the depression. The intervention may not be sufficiently tailored to the interaction characteristics of mothers with such disorder. It needs to be examined to which extent the present

intervention is also applicable to depressed mothers with comorbid disorders. Meanwhile, a careful intake is needed to determine the chance of success in individual cases.

Recently, we have initiated a randomized control study on the short-term and long-term effects of the mother-baby intervention on the quality of the mother-infant interaction. About eighty depressed mothers-infants pairs will participate in the study. Mother-child interaction, the mother-infant attachment relationship, and various aspects of child development are used as outcome variables. This study also implies the evaluation of the usefulness of the model described in this paper. And finally, it aims to find out which mothers and babies benefit most of this kind of preventive intervention.

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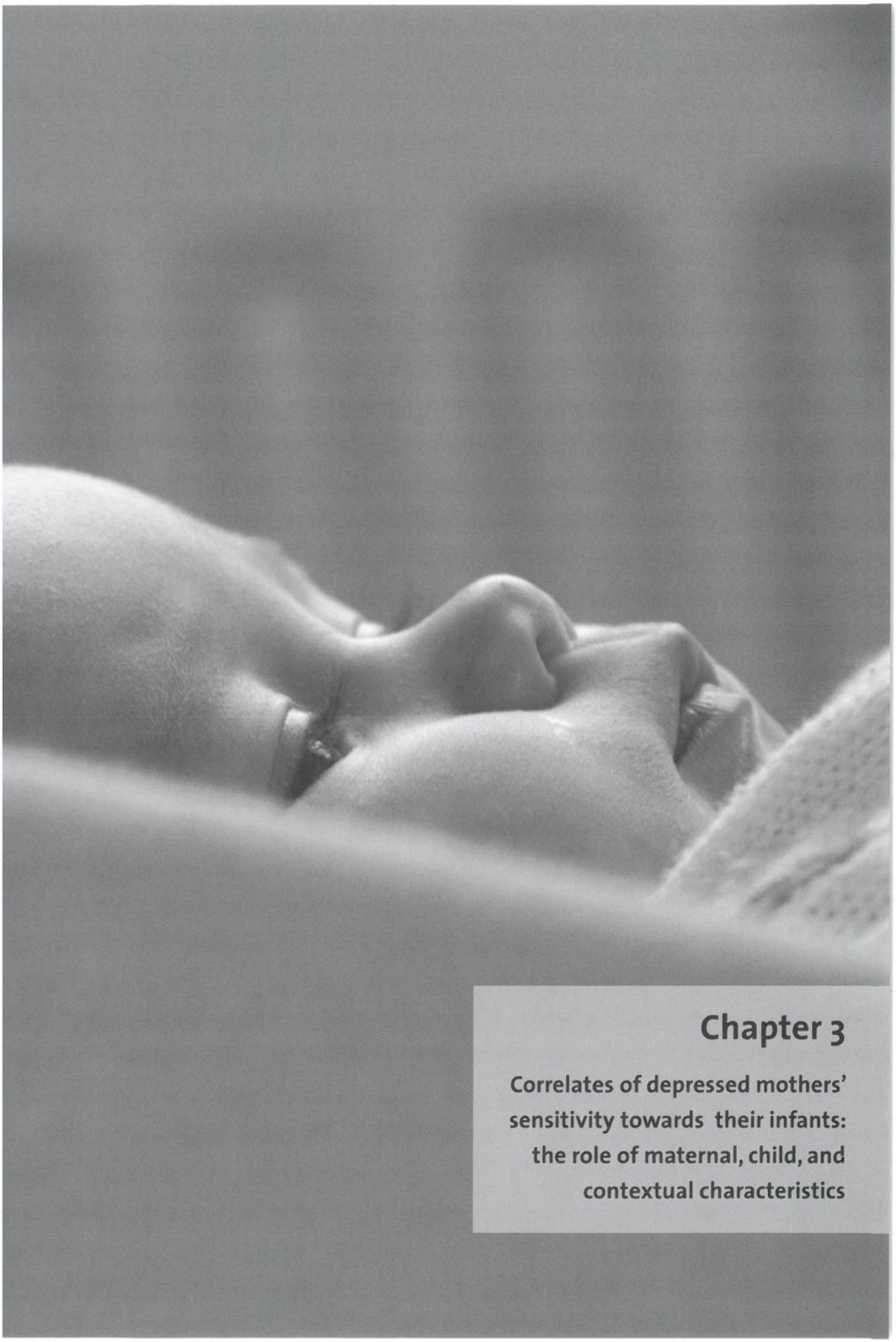

Chapter 3

Correlates of depressed mothers' sensitivity towards their infants: the role of maternal, child, and contextual characteristics

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In this study various maternal, child, and contextual characteristics are examined, as well as the number of risk factors present, in order to distinguish which factors explain variance in the sensitivity of depressed mothers towards their infants. Participants were depressed mothers (n=84) with their infants aged 1 month up to one year. Mothers were videotaped while bathing their children. The recordings were rated using the sensitivity scale of the Emotional Availability Scales. Three characteristics independently contributed to the explained variance in maternal sensitivity: level of education, feelings of parental incompetence, and family income. In addition, two subgroups were found to be particularly at risk: young mothers with high levels of depressive symptoms and low-income mothers who felt insecure about their parental competence. Together, these factors explained 23% of the variation in sensitivity in our sample of depressed mothers. The number of risk factors explained 9.8% of the variation in sensitivity. The present results have implications for preventive interventions. Identifying specific groups at risk for low maternal sensitivity at an early stage may lead to favourable outcomes of targeted interventions that focus on enhancing depressed mothers' maternal sensitivity and feelings of parental competence.

3.1 Introduction

In recent years, much has become known about the negative impact of accumulating unfavourable conditions on the quality of parenting. Many studies on this topic have applied Belsky's theoretical framework (1984). The model is comprehensive in that it takes into account not only the individual characteristics of infant and parent, but also aspects of the care-giving context. Extensive empirical support for the model has been found in various populations, e.g., teenage mothers and their 8- to 15-months-old children (Luster, 1998), mothers of 5- to 7-year-olds (Meyers, 1999), and a community-based sample of parents with 15-month-old infants (Van Bakel & Riksen-Walraven, 2002). While there is now substantial knowledge on the determinants of parenting in healthy mothers, less is known about the determinants of parenting in mothers who suffer from mental illness. The present study focused on likely determinants of parenting in mothers with a postpartum depression.

Various studies have shown that maternal depression negatively affects the quality of the mother–child interaction, especially mothers' sensitivity towards their children's signals and needs (Cummings & Davies, 1994; Field, 1998; Goodman & Gotlib, 1999; Murray & Cooper, 1997). Maternal sensitivity includes a variety of parental qualities that include affect, timing, flexibility, acceptance, conflict negotiation, and the parents' awareness of their children's cues, as well as appropriate responsiveness (Biringen, Robinson, & Emde, 1998). Lowered maternal

sensitivity, in turn, negatively affects various aspects of a child's development. Attachment research, for example, has repeatedly documented the association between less sensitive and responsive parenting and an increased rate of insecure parent–child attachment among young children (De Wolff & Van IJzendoorn, 1997; Van den Boom, 1994). However, despite the generally lower levels of sensitivity found in depressed mothers, studies reporting effects of maternal depression on child outcomes found a substantial number of children of depressed caregivers that did *not* evidence dysfunction. This implies that there is considerable variation in the sensitivity among depressed mothers, which is associated with the variance in developmental outcomes among their children. Moreover, it also seems to imply that, apart from maternal depression, other maternal, contextual, and child characteristics may contribute to the differences in maternal sensitivity, or that they may interact with maternal depression to affect maternal sensitivity (or child development).

Maternal characteristics repeatedly found to be related to sensitivity are the severity and chronicity of a mother's depressive symptoms (Campbell, Cohn, & Meyers, 1995; NICHD, 1999). Previous studies show differences, both within and between studies, in terms of using samples of mothers with depressive symptoms and mothers diagnosed with depressive disorders. The course of the depressive symptoms tends be more important than the diagnostic status of the depression (Seifer, Dickstein, Sameroff, Magee, & Hayden, 2001). Furthermore, a longitudinal study of depressed mothers found the severity of the depression to be predictive of insecure attachment in infants aged one and two years (Teti, Gelfand, Messinger, & Russell, 1995). Depression with comorbid psychopathology was also found to impair the quality of mother–child interactions (Carter, Garrity-Rokous, Chazan-Cohen, Little, & Briggs-Gowan, 2001). A fourth characteristic that might explain differences in sensitivity between depressed mothers includes the mothers' feelings of incompetence as parental caregivers. Depressed mothers generally regard themselves more unfavorably as parents and feel less attached to their children than non-depressed mothers (Frankel & Harmon, 1996; Cox, Puckering, Pound, & Mills, 1987). Further, associations have been reported between lower levels of education and low socio-economic status on the one hand and maternal sensitivity on the other (Albright & Tamis-Lemonda, 2002; Hammen, 2002; Sameroff, Seifer, & Barocas, 1983). Finally, contradictory results have been found for maternal age. In one study, younger mothers showed less favourable parenting and lower child acceptance (Levine, Pollack, & Comfort, 2001), although Pederson et al. (1990) had earlier failed to find such evidence. When occurring in combination with other stressors, young maternal age appears to be a strong predictor of parenting problems (East, Matthews, & Felice, 1994; Fox, Platz, & Bentley, 1995).

Certain child characteristics have also been found to make infants more vulnerable to developmental problems, which may also affect maternal sensitivity. This includes children who have experienced perinatal difficulties (including low birth weight, long duration of labour, caesarean birth, and induction of labour in combination with difficult temperament). Neurological problems that compromise the regulation of autonomic processes have been found to occur more frequently among low-birth-weight preterm babies and play a key role in the developmental prognoses for high-risk infants. Difficulties of neural autonomic regulation are associated with irritability or negative emotionality in infancy (Porges, 1996). In turn, a difficult temperament in children has been found to be related to low maternal sensitivity (Van Bakel & Riksen-Walraven, 2002; Van den Boom & Hoeksema, 1995). However, studies on the relation between perinatal risk factors and difficult temperament have shown inconsistent findings (Ross, 1987).

The present study included four contextual characteristics that earlier research had found to be related to maternal sensitivity in depressed mothers: chronic stress, stressful life events, social support, and SES. Families with a depressed parent may be exposed to multiple chronic stressors that typically accompany depressive disorders, such as economic hardship, relational difficulties, work-related problems, stressful episodic life events, and lack of social support (Belsky, 1984; Hammen, 2002; Rutter & Quinton, 1984). Several researchers have found that the presence of life events, chronic stress, lack of social support from the spouse, and low SES impact on the quality of the dyadic interaction between depressed mothers and their infants (Lyons-Ruth Easterbrooks, & Cibelli, 1997; Mertesacker, Bade, Haverkock, & Pauli-Pott, 2004; Murray, Fiori-Cowley, Hooper, & Cooper, 1996).

Evidently, it is particularly the combination or accumulation of unfavourable circumstances that negatively affects the mothers' sensitivity. This is consistent with studies demonstrating that the risk of mental disorders is not increased by single risk factors but by their number or interaction (Rutter & Quinton, 1984; Mrazek & Haggarty, 1994). Most of the above findings were reported in studies that included both depressed and non-depressed mothers. However, not all depressed mothers are insensitive towards their infants. Little is known about the way maternal sensitivity is affected by a depressed mother's level of depressive symptoms, for instance. To facilitate early identification of risk groups, it would be interesting to ascertain which maternal, child, and contextual factors specifically affect maternal sensitivity. This would also foster the development or modification of early, preventive interventions aimed at improving maternal sensitivity in specific risk groups. The present study therefore aimed to shed more light on the independent or interactive contributions of maternal, child, and contextual characteristics to the variance in maternal sensitivity in a sample of mothers

with various levels of a postpartum depression. It is also analyzed how much the number of risk factors present contributed to the explained variance in maternal sensitivity. The expected relationships between the various characteristics, the number of risk factors and the mothers' level of sensitivity are summarized in the model depicted in Figure 1. The study tested five main hypotheses:

1. Of the maternal characteristics, it is specifically a high level of depressive symptoms, the presence of comorbidity, prolonged duration of symptoms, feelings of parental incompetence, low education, and young age that are associated with lower sensitivity in depressed mothers, both independently and in interaction.
2. Of the child characteristics, it is specifically low birth weight and perinatal difficulties that are associated with lower sensitivity in depressed mothers, both independently and in interaction with each other
3. Of the contextual characteristics, it is specifically high stress, low family income, and the absence of social support that are associated with lower sensitivity in depressed mothers level, both independently and in interaction with each other.
4. Interactions between maternal, child, and contextual characteristics explain variance in maternal sensitivity.
5. A larger number of risk factors is associated with lower maternal sensitivity.

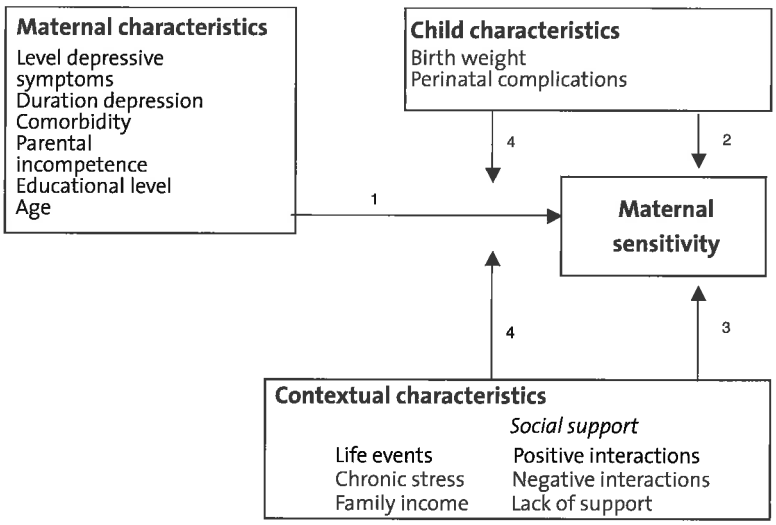


Figure 1. Model of the relationships between maternal, child, and contextual characteristics and maternal sensitivity. The numbers refer to hypotheses specified in the text.

3.2 Method

Participants

Participants were 84 depressed mothers with infants aged between 1 and 12 months (34 girls, 50 boys; M= 5.7 months, SD= 3.1). Sixty percent of the children were firstborns, the remaining 40% had one or two siblings (age range 1 to 16 years; M =3.9). Their average birth weight was 3224 g; 15% had a birth weight below 2500 g. The mothers were between 20 and 38 years of age (M= 30.0, SD = 3.9). Sixty-nine were of Dutch origin and fifteen were immigrants or descendants of immigrants of various other origins (nine Turkish, two Moroccan, two Surinam, one Portuguese, one Australian). All immigrant mothers had the Dutch nationality and were able to speak Dutch. Most mothers shared their household with a partner; only 7% were single mothers. The education level ranged from low (1), i.e., elementary school only, to high (7), i.e., university degree or more. Family income ranged from 1 (less than USD 800 a month) to 5 (more than USD 2900 a month). Based on their level of education and income, half of the mothers were classified as having an average socio-economic status, 25% as having a high status and 25% as having a low status. Almost half of the mothers (44%) had employment outside the home, 25% were homemakers, 10.7% were (involuntarily) unemployed, and 20.3% were receiving incapacity benefits. The participants were living in locations spread across the country, both in urban and rural areas. The mothers exhibited high levels of depressive symptoms: 70 mothers were diagnosed with a depressive episode, 10 with dysthymia, and 4 with high levels of depressive symptoms. Seventy-six percent of the mothers had some form of comorbidity, mostly anxiety disorders (62%).

Procedure

The women had originally been recruited by their therapists for a more comprehensive intervention study or had responded to our advertisements in newspapers and parenting magazines and on web-sites. About 95% of the women were receiving treatment for their depression or were in the process of arranging professional help. When the mothers agreed to participate in the study, they were asked to sign an informed consent form. The candidate's therapist was asked to fill out a questionnaire about their client's diagnosis and treatment. Next, a general questionnaire for both the mother and father (if available) or paternal caregiver was forwarded by post. Subsequently, one of the three researchers visited the family at home, where they assessed the mother for depression and depressive symptoms using a structured diagnostic interview and the Beck Depression Inventory (BDI, Beck, Rush, Shaw, & Emery, 1979). If she was diagnosed as having a depressive episode or dysthymia, or exhibited an elevated level of depressive symptoms (BDI >14), she was included in the study. Mothers with a psychotic disorder, manic

depression, and/or addiction were excluded. Information about comorbidity was also retrieved from the diagnostic interview. After the interview, and with the mother's consent, the mother–child interaction was videotaped (15-20 minutes) while the mother was bathing her child.

3.3 Measures

Depression and comorbidity were assessed by means of the Mini International Neuropsychiatric Interview (MINI, Sheehan et al., 1998), using the Dutch version by Overbeek, Schruers, & Griez, (1997). The MINI is a short diagnostic interview to evaluate 17 axis I diagnoses according to DSM-IV criteria (APA, 1994). The inter-rater reliability has been found to be satisfactory (r = .75). Our study compared the results of the diagnostic interview with the diagnosis independently established by the respondent's therapist. Cohen´s Kappa for agreement about the diagnosis was .90. The Beck Depression Inventory (BDI; Beck et al., 1979) is a 21-item self-report questionnaire that assesses a respondent's level of depressive symptoms during the past week. High scores reflect high depression levels. The BDI reliably discriminates between clinically depressed and non-depressed persons. The BDI's good psychometric properties have been repeatedly reported, average Cronbach's alpha for non-psychiatric samples being .82 (Richter, Werner, Kraus, & Sauer, 1998). Cronbach´s alpha for our sample was .89.

The mothers' feelings of incompetence in child-rearing were assessed using the "uncertainty" subscale of the questionnaire designed by Engfer & Garvranidou (1987). This subscale includes 5 items that refer to parents' feelings of insecurity and uncertainty in child-rearing (" I am not sure if I am doing something wrong with my child","It is difficult for me to recognize what is wrong with my child when he/she is restless","I keep thinking I am not a good parent","I have the feeling that what I am doing with my child is wrong"," I have to take care that my child will not end up being just like me.").

For each item, the mother was asked to indicate on a 3-point Likert scale to what extent the item applied to her. Engfer & Garvranidou (1987) reported a Cronbach's alpha of .76 for the *uncertainty* subscale, and the same internal consistency rate was found in our study. Validity of the scales has been shown in several studies, and high correlations have been found with the quality of the parent–child interaction (Riksen-Walraven , Meij, Hubbard, & Zevalkink, 1996).

The Social Support List (SSL; Van Sonderen, 1993), a Dutch self-report instrument, was used to measure the frequency of supportive interactions experienced by the respondent and the extent to which the support received corresponded to her needs. Whereas the original list comprises 34 items covering four dimensions, we restricted ourselves to three dimensions of emotional support: positive

interactions (including day-to-day emotional support and emotional support in case of problems, 12 items), negative interactions (7 items), and lack of support (12 items). The reliability of the three SSL scales was adequate, with Cronbach's alphas of .92, .85, and .88, respectively. Chronic stressors and negative life events in the past month were assessed by means of an 11-item checklist derived from the Survey of Recent Life Experiences, a Dutch questionnaire for life events, and the long-term difficulties questionnaire (De Jong, Timmerman, & Emmelkamp, 1996). The areas that were covered were pregnancy, delivery, infant health, relationships with the partner, family, and others, bereavement, divorce, family health, financial status, housing, employment, legal maters, and other (miscellaneous) problems.
The video recordings of the bathing session (about 15 minutes) were assessed to rate the mother's sensitivity towards her infant, using the 9-point sensitivity scale of the Emotional Availability Scales, Infancy to Early Childhood Version up to 4 years, with a score of 1 indicating lack of sensitivity and a score of 9 indicating optimal sensitivity (EAS; Biringen et al., 1998). For very young children (0–6 months), we used the adaptation of EAS for younger children. The key component of sensitivity is the parent's ability to be warm and emotionally connected with the child. Each tape was independently rated by four observers: either the first or second author, or both, and two graduate students. All raters were trained to reliability with the second author, an expert criterion coder. She had been trained by one of designers of the EAS, JoAn Robertson. The raters were blind to the results of the other measures in the study. Disagreement (beyond the one point range) was discussed and consensus scores were determined for use in the analysis. Reliability was checked in a random sample of 20% of the interaction recordings, stratified by the age of the infants. This sample was also scored by other raters. The inter-rater reliabilities, expressed as Cohen's Kappa's, exceeded .85 for the parental sensitivity scales, indicating excellent agreement

3.4 Results

The results are discussed below in three stages. The first subsection presents descriptive statistics and simple correlations between the study variables. This is followed by the results of the four hierarchical regression analyses that we conducted to test how maternal sensitivity could be explained by maternal, child, and contextual characteristics. The final subsection presents the results regarding the contribution of the number of risk factors.

Descriptive statistics and relations between the variables
Table 1 presents the descriptive statistics and the correlations between the variables studied. The distribution of the scores for depressive symptom duration,

Table 1 Means, standard deviations, ranges and Pearson correlations for the the variables (n = 84)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Mean	SD	Meadian	Min	Max
Mother's characteristics																				
1. Educational level	-															4.05	1.87	4	1	7
2. Age	.31**	-														29.9	3.88	29.9	20	38
3. Parental incompetence: uncertainty	-.08	-.04	-													4.57	2.79	4.8	0	10
4. Level depressive symptoms	-.14	-.18*	.50**	-												24.05	10.38	23	10	52
5. Comorbidity [1]	-.10	.14	.29**	.06	-											.70	.46	1	0	1
6. Duration depression [1]	-.27**	-.05	.10	.35**	.14	-										1.79	1.08	2	0	3
Child characteristics																				
7. Birth weight	.05	.11	-.05	-.06	-.22*	-.12	-									3224	703.5	3270	1065	5600
8. Perinatal complications	.03	.09	.10	.22*	.06	-.07	.05	-								.48	.50	1	0	1
Contextual characteristics																				
Social support																				
9. Positive interactions	.16	.06	-.25*	-.25*	-.06	-.35**	.18*	.14	-							30.27	7.78	32	11	48
10. Negative interactions	-.17	-.12	.36**	.44**	.04	.35**	-.19*	.02	-.27**	-						12.06	4.30	11	4	25
11. Lack of support	-.15	-.16	.35**	.45**.	.11	.29**	-.01	-.06	-.65**	.47**	-					21.63	7.26	14	11	36
12. Family income	.37**	.36**	-.05	-.05	.05	-.24*	.10	.02	.16	-.17	-.13	-				2.53	1.23	3	0	4
13. Life events [1]	-.09	.14	.17	.21*	-.01	.15	-.14	.23*	-.07	.20*	-.04	-.08	-			1.21	1.45	1	0	5
14. Chronic stress	-.13	.02	.18*	.40**	.06	.33**	-.13	.12	-.07	.34**	.22*	-.14	.43**	-		2.44	2.18	2	0	9
Mother–child interaction																				
15. Maternal sensitivity	.35**	.32**	-.25*	-.15	-.13	-.09	.07	.08	.26**	-.21*	-.26**	.32**	.01	-.01	-	4.25	2.02	4.3	1	8

Note: $^{*}p < .05$, $^{**}p < .01$, *one-tailed*

[1] correlations after transforming scores to normality

Table 2 Results of hierarchical regression explaining the variance in sensitivity from maternal, child, and contextual characteristics (n = 84).

Variable	β	SE	T	Δ R^2
Regression 1 : Maternal characteristics				
Educational level	.25	.11	2.39*	11.2 %
Parental incompetence: uncertainty	-.21	.07	-2.11*	4.1 %
Level depressive symptoms *x* age	.20	.01	2.05*	2.3 %
			Total R^2 =	23 %
			$F(4, 83)$ =	6.98
Regression 2: Child Characteristics		Not significant		
Regression 3 : Contextual characteristics				
Social support				
- Positive interactions	.22	-	2.09	-
- Negative interactions	-.17	-	-1.57	-
- Lack of support	-.23	.03	-2.19*	4 %
Family income	.29	.17	2.80**	9 %
Life events	.03	.14	.25	-
Chronic stress	.03	-	.24	-
			Total R^2 =	13 %
			$F(2, 83)$ =	7.23

* $p < .05$,** $p < .01$

comorbidity, and life events showed mild to moderate skewness. These variables were transformed to normality by log transformation.

Variance in maternal sensitivity as explained by maternal, child, and contextual characteristics

The hypotheses were tested using four hierarchical linear regressions. To reduce number of interaction terms in the regression analyses, we entered the study

variables in a loglinear analysis after having dichotomized them. This analysis required dichotomizing because of the large number of variables, categories, and possible interactions. All variables were dichotomized with the cutoff at the median. This loglinear analysis revealed that there were only two- and three-way interactions that were associated with maternal sensitivity. In view of this, the original non-dichotomized values of the variables were reinstated in the hierarchical regression analysis. The interactive terms were computed according to the procedures outlined by Aiken & West (1991).

The first regression analysis tested our hypothesis that maternal characteristics make independent and interactive contributions to the variance in maternal sensitivity. The six maternal variables were simultaneously entered as predictors in the first block, while the possible two- and three-way interaction terms were entered in the second block. The results are shown in the upper panel of Table 2 (Regression 1). Two maternal variables contributed independently to the explained variance in maternal sensitivity: level of education and sense of parental incompetence. One interaction term, i.e., level of depressive symptoms *x* age, added significantly to the explained variance in maternal sensitivity, indicating that higher levels of depressive symptoms were related to lower maternal sensitivity in the younger but not in the older mothers. The second regression analyzed the association between child characteristics and maternal sensitivity (see Table 2, regression 2). None of the factors proved significant. Next, we analyzed the contextual characteristics (Table 2, Regression 3). Two variables, lack of support and family income, added independently to the explained variance in maternal sensitivity. None of the interaction terms between the contextual variables contributed to the variance in maternal sensitivity. Furthermore, a fourth regression analysis examined what maternal and contextual characteristics jointly contributed to the explained variance in maternal sensitivity (Table 3).

The child characteristics were not entered in this regression analysis because none of them correlated with maternal sensitivity. The significant maternal characteristics from the first regression analysis were entered in the first block, followed by the significant contextual characteristics in block 2. The interactions between the maternal and contextual characteristics were entered in the third block. This procedure yielded one significant interaction between maternal and contextual characteristics: parental incompetence interacted with low income, so the present data provide evidence that lower-income mothers who feel insecure about their parenting abilities exhibit less maternal sensitivity.

To test the hypothesis that a larger number of risk factors is associated with lower maternal sensitivity, the variables which were significantly correlated with maternal sensitivity were recoded median-split, into high (1) or low risk (0). For

Table 3 Results of hierarchical regression explaining the variance in sensitivity from maternal, contextual characteristics and interactions (total model)

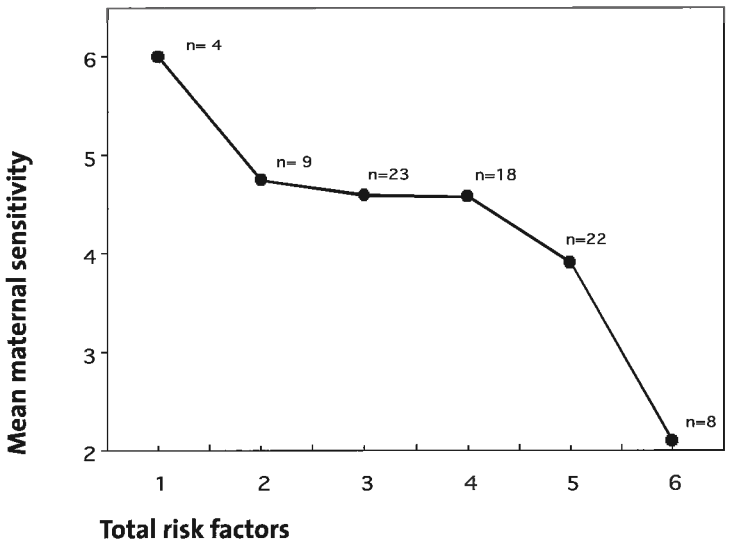
Variable	β	SE	T	Δ R^2
Regression 4 : Maternal and contextual characteristics				
Block 1: significant maternal characteristics				
Educational level	.25	.11	2.49*	11.2 %
Parental incompetence: uncertainty	-.22	.07	-2.35*	4.3 %
Level depressive symptoms x Age	.20	.01	2.07*	2.3 %
Block 2: significant contextual characteristics				
Family income	.26	.10	2.53*	2.0 %
Lack of support	-.11	-	-1.09	-
Block 3: significant interactions				
Parental incompetence: uncertainty x income	.27	.07	2.78**	3.0 %
			R^2 Final model = 23 %	
			F (6, 83) Final model = 7.72	

* $p < .05$,** $p < .01$

the age of the mother a more conservative method was used: high risk ≤ 21 years = 1, low risk > 21 years =0). Next, the number of risk factors was entered in a regression analysis. This procedure showed that this accumulation of unfavourable circumstances added significantly to the explained variance in maternal sensitivity (ΔR^2= 9.8 %, F (1, 83) = 9.99, β = -.50, t(84) = -3.16, $p < 0.05$). The graph (Figure 2) shows that more than four risk factors correlated with lower maternal sensitivity. Thirty-five percent of the mothers had more than four risk factors.

In sum, five maternal and contextual characteristics explained 23% (adjusted R^2) of the variance in maternal sensitivity, viz., educational level, parental incompetence, family income, level of depressive symptoms *x* age, and sense of parental incompetence *x* family income. The number of risk factors explained 9.8 % (adjusted R^2) of the variance in the sensitivity of depressed mothers.

Figure 2 Number of risk factors in relation to maternal sensitivity



3.5 Discussion

The present study examined maternal, child, and contextual characteristics in relation to maternal sensitivity in a sample of young mothers suffering from postpartum depression. Five variables independently contributed to the explained variance in maternal sensitivity in our group of depressed mothers. First of all, a low level of education, feelings of parental incompetence, and low income were associated with lower levels of sensitivity of depressed mothers. In addition, significant interaction effects indicated two subgroups of depressed mothers to be particularly at risk for exhibiting low levels of sensitivity, viz., young mothers with high levels of depressive symptoms and low-income mothers who feel insecure about their parental competence. Together, these five variables explained 23% of the variance in maternal sensitivity. The results imply that even chronically depressed mothers with comorbidity are able to be sensitive to their child as long as there are protective factors present such as feeling competent as a parent, reasonable educational level, and adequate family income. We also examined the effect of the number of risk factors associated with maternal sensitivity, which explained 9.8 % of the variance in the sensitivity of depressed mothers.

Unexpectedly, we failed to find a relationship between the level of the mothers' depression and their sensitivity towards their infants in the total sample, although we did find such a relationship for the younger mothers. It should be noted that the mothers in our sample all had relatively high levels of depression. Apparently,

any variation in the severity of their depressive symptoms did not add to the explanation of the variation in their sensitivity. Most of the earlier studies that did report a significant effect on maternal sensitivity compared samples of depressed and non-depressed mothers. Comparing the mean score for maternal sensitivity (M = 4,3) of our sample with the mean score (M = 6,5) of a healthy population from another Dutch study (Van Bakel & Riksen-Walraven, 2002) shows that the maternal sensitivity in our sample of depressed mothers was indeed significantly lower ($p < 0.01$).

Studies of the impact of maternal age on sensitivity have yielded contradictory results. The interaction effect of severity and age on maternal sensitivity found in our study might explain the different outcomes, indicating a special risk of insensitivity in young depressed mothers.

We assumed that the absence of adequate social support and the presence of stress would independently contribute to the explanation of variance in maternal sensitivity. Our initial analyses did indeed identify lack of support as a significant contributor. When the significant maternal characteristics were entered into the regression first, however, lack of support did not add significantly to the explained variance in maternal sensitivity. This can be explained by the moderate relationship between lack of social support and the mothers' level of depressive symptoms and feelings of parental incompetence. Furthermore, neither the duration of the depression nor comorbidity were associated with maternal sensitivity, probably because they were also moderately related to the level of depressive symptoms.

Limitations

Some limitations of our study should be mentioned. First, several studies, though not all, have reported that a child's temperament can explain variance in maternal sensitivity (Van den Boom & Hoeksema, 1995). Unfortunately, we did not include such an assessment. Secondly, any causal interpretation of the results is limited by the cross-sectional nature of our study.

A final limitation concerns the use of imprecise measures to explain the mechanisms behind the mothers' decreased sensitivity. In the future, we need to examine the mechanisms that may explain, for example, why low educational level is associated with low maternal sensitivity.

Future research

As mentioned above, further research is needed to gain more insight into the mechanisms that may explain the correlates of depressed mothers' sensitivity found in this study. An interesting link that needs further exploration, for example, is the association between feelings of parental incompetence and lower levels of

sensitivity that was found for depressed mothers in general, and for depressed mothers with lower incomes in particular. Although feelings of parental incompetence are significantly and substantially correlated with level of depression (see Table 1), it was particularly the feelings of parental incompetence that were linked with lower levels of sensitivity, and not so much the level of depression itself. This makes it interesting to further explore the relation between feelings of parental incompetence and other depression-related negative cognitions. For example, do depression-related negative cognitions in certain domains generalize to the domain of parenting? And what is the causal nature of the correlations between level of depression, feelings of parental incompetence, and maternal sensitivity? Could there be a complex transactional mechanism at work, in which feelings of parental incompetence not only negatively affect maternal insensitivity, but are also themselves negatively affected by the insensitive, low-quality mother-infant interactions; and could such feelings of parental incompetence negatively affect maternal cognitions in other domains? The complex relationship between depression-related negative cognitions, feelings of parental incompetence, and maternal sensitivity can only be further explored in longitudinal research in which all of the relevant variables are assessed repeatedly over time. Such longitudinal studies should include questionnaires that assess negative cognitions in various domains, such as the ATQ (Automatic Thought Questionnaire, Hollon & Kendall, 1980). Another feature of the present study that deserves more detailed analysis is the concept of maternal sensitivity. The majority of studies on sensitivity and maternal depression have been based on the same global measure of sensitivity this study used. The moment-by-moment detailed assessment of sensitivity suggested by Peck (2003) might be interesting for future research.

Clinical Implications

As low maternal sensitivity is generally assumed to negatively affect a child's development, the results of our study have several important implications for preventive interventions at an early stage. First, our findings have helped to identify several subgroups of mothers at high risk for developing low maternal sensitivity, which can now be specifically targeted by prevention programmes, viz., young mothers with high levels of depressive symptoms, low-income mothers with high feelings of parental incompetence and depressed mothers with more than four risk factors. Public health services, such as health nurses in well-baby clinics, but also paediatricians, should be involved in the early detection of depression in mothers with young children and mothers at risk (adolescent mothers). Secondly, our study highlights the need for targeted early intervention programmes that help depressed mothers raise their sensitivity towards their infants and strengthen their feelings

of parental competence. Several of such programmes are already operational and have proven to be effective (Field, 1998; Lyons-Ruth, Connell, Grunebaum & Botein, 1990). In the Netherlands, a special mother–baby programme for depressed mothers and their infants, referred by their clinicians from adult psychiatry care, is being implemented (Van Doesum, Hosman, & Riksen-Walraven, 2005).

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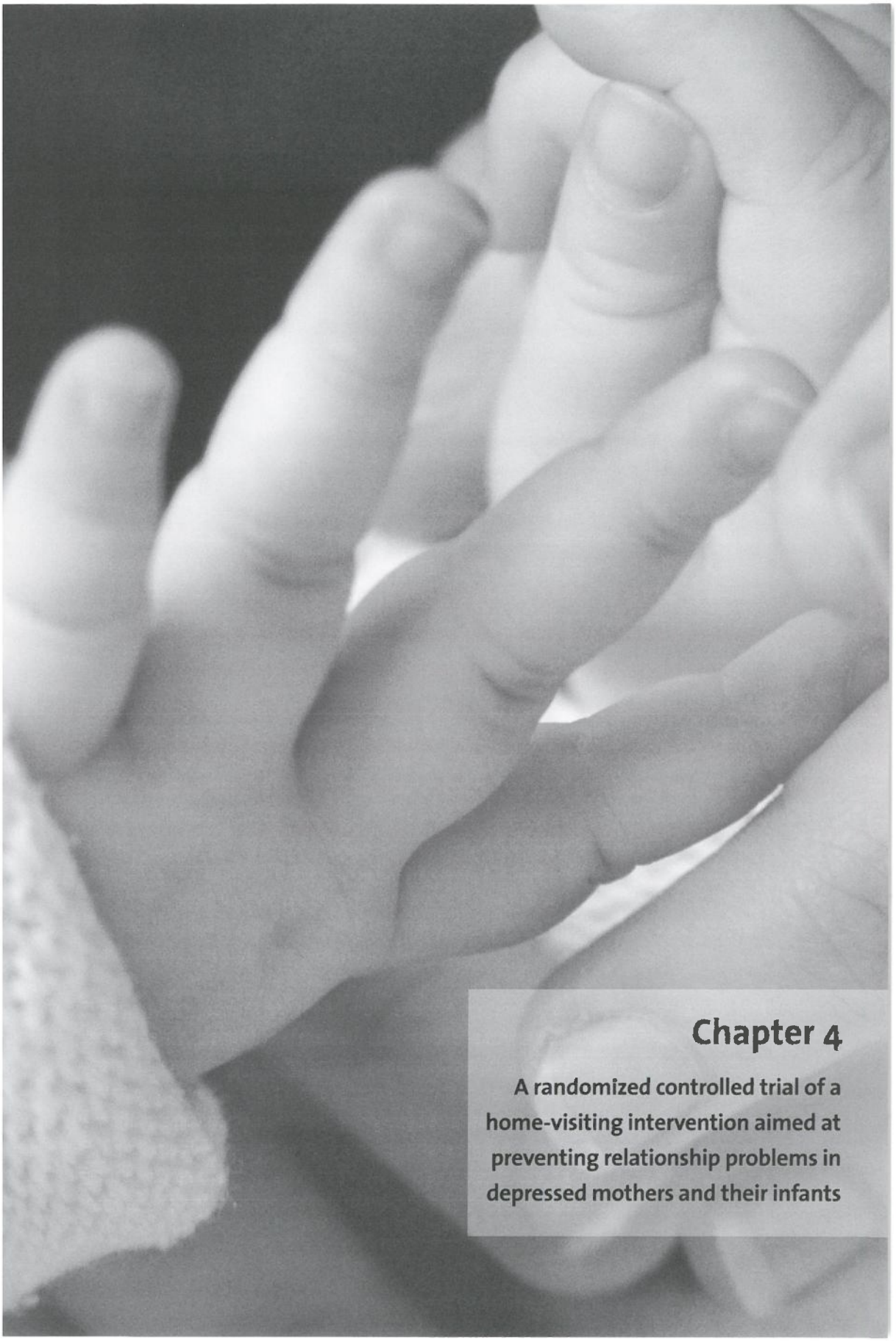

Chapter 4

A randomized controlled trial of a home-visiting intervention aimed at preventing relationship problems in depressed mothers and their infants

This chapter is based on: Van Doesum, K.T.M., Riksen-Walraven, J.M., Hosman, C.M.H. & Hoefnagels, C. (in press). A randomized controlled trial of home-visiting intervention aimed at preventing relationship problems in depressed mothers and their infants. *Child Development.*

This study examined the preventive effect of an early mother–baby intervention on the quality of mother–child interaction, infant–mother attachment security, and infant socio-emotional functioning, in a group of depressed mothers with infants aged 1–12 months. A randomized controlled trial compared an experimental group (n = 35) receiving the intervention programme (8–10 home-visits) with a control group (n=36) receiving parenting support (three telephone contacts). There were three assessments: pre-test, post-test and follow-up after 6 months. The intervention had positive effects on the quality of mother–infant interaction, in terms of maternal sensitivity and infant responsiveness and involvement. Infants in the experimental group had higher scores for attachment security and for one aspect of socio-emotional functioning, namely competence, at the follow-up test. The intervention proved successful in preventing deterioration of the quality of mother–child interaction, which is an important risk factor for adolescent and adult psychopathology.

4.1 Introduction

Many studies have reported the adverse effects of maternal depression on offspring. Infants of depressed mothers have been found to be at increased risk of developing mental and behavioural problems, and it has been shown that some infants already exhibit behavioural, physiological, and biochemical deregulations shortly after birth (Field, 1998). In the course of the first year, many infants of depressed mothers start to show higher levels of distress, negativity, and avoidance of the mother (Cohn, Campbell, Matias & Hopkins, 1990; Gelfand & Teti, 1990; Murray, Fiory-Cowley, Hooper, & Cooper, 1996). In one- and two-year-old children, maternal depression has been found to be associated with impaired socio-emotional and cognitive development (Murray et al., 1996). Infants of depressed mothers are more likely to be less sociable and more fearful of strangers, to have lower frustration tolerance, more behavioural problems (e.g. disturbed sleeping and eating patterns), temper tantrums, and separation difficulties, and to be more often insecurely attached compared to infants of non-depressed mothers (Cicchetti, Rogosch & Toth, 1998). In addition, their cognitive development as assessed by various standardized tests has proved to be delayed (Murray et al., 1996: Lyons-Ruth, Easterbrooks & Cibelli, 1997). Children of depressed parents also run an increased risk of developing a major depressive disorder in childhood or adolescence as well as an anxiety disorder and alcohol dependence in adolescence or early adulthood (Weissman, Warner, Wickramaratne, Moreau & Olfson, 1997). As many as 50% of the children of depressed mothers, will have experienced an episode of depression themselves by the end of adolescence (Beardslee & Wheeloc, 1994; Downey & Coyne, 1990).

Among the various mechanisms proposed to explain the effects of maternal depression on child outcomes, the early mother–child interaction has been assigned

a central role (Cummings & Davies, 1994: Field, 1998; Goodman & Gotlib, 1999; Van Doesum, Hosman & Riksen-Walraven, 2005). The mother–infant interaction in depressed mothers differs in various respects from that in non-depressed mothers. Depressed mothers express fewer emotions, show more sad affect, and are less involved and more intrusive than non-depressed mothers. They speak less to their children and show more covert and overt hostility toward their children (Cohn et al., 1990; Field, Healy, Goldstein, & Guthertz, 1990; Goodman, Adamson, Riniti & Cole, 1994; Hops et al., 1987; Radke-Yarrow, Nottelman, Martinez, Fox, & Belmont, 1992). When a mother is affectively unresponsive and emotionally unavailable, her infant is likely to exhibit behavioural disorganization, avoidance, and lack of positive affect, which, in turn, has a negative effect on maternal behaviour (Tronick & Weinberg, 1997).

There is growing evidence that an insecure mother–infant attachment at least partly explains the link between a disturbed mother–child interaction and negative developmental outcomes in children. Children of depressed mothers have been found to be at risk of insecure attachment, and insecure attachment has been found to be associated with socio-emotional and behavioural problems in childhood and adolescence (Carlson & Sroufe, 1995: Cicchetti et al., 1998; Field, 1989; Radke-Yarrow, Cummings, Kuczynski, & Chapman, 1985; Spieker & Booth, 1988).

In view of these serious implications, an early intervention programme for depressed mothers and their infants was developed (Van Doesum et al., 2005). This mother–baby intervention programme aims to improve the interaction between depressed mothers and their infants, thus fostering a secure mother–infant attachment and preventing developmental problems in the children. The focus of the intervention programme is on maternal sensitivity, widely considered to be one of the most crucial dimensions of the mother–infant interaction and to be important for the development of children in the first years of life (De Wolf & Van IJzendoorn, 1997). The programme is based on existing American intervention programmes focused on improving the quality of mother–child interactions for depressed mothers and their babies, as well as on other programmes targeting mothers and infants at risk, and on successful Dutch early interventions for various other types of high-risk families with infants (Gelfand, Teti, Seiner & Jameson, 1996; Field, 1998; Lyons-Ruth, Conell, Grunebaum & Botein, 1990; Field, et al., 2000; Juffer, Hoksbergen, Riksen-Walraven & Kohnstamm, 1997, Juffer, Bakermans-Kranenburg & Van IJzendoorn, 2005, Riksen Walraven, 1978; Riksen-Walraven, Meij, Hubbard & Zevalkink, 1996: Van den Boom, 1994). These evidence-based programmes varied in intensity (3–47 home-visits), timing (age of the infant 5–8 months), and focus (maternal sensitivity, support, improving parenting skills and/or maternal job education). For the current mother–baby intervention, we adopted and combined several

elements from the earlier programmes, to help improve mother–infant interaction. The most important of these elements were: interaction coaching tailored to the mother's interaction style, promoting the frequency of touching (for example by baby massage), and encouraging the (non-depressed) partner or other adults to offer the mother more social support (Field, 2002). The intervention distinguished itself from earlier programmes for depressed mothers by its relatively restricted length, its distinctive key focus (i.e. the improvement of maternal sensitivity), the possibility of an early start of the intervention in the infants' first weeks of life, and its position, being embedded in the Dutch mental health care services.
In this study we examined the effect of the early intervention programme on the quality of the mother–child interaction, infant–mother attachment security, and children's socio-emotional functioning. We expected to find a positive effect of the programme (1) on the quality of the mother–child interaction, particularly a mother's sensitivity toward her child and the child's responsiveness and involvement toward its mother, and (2) on infant–mother attachment security and a child's socio-emotional functioning.

4.2 Methods

Participants

Eligible for participation were mothers with an infant younger up to 12 months, who (1) met the DSM-IV criteria (APA, 1994) for a major depressive episode or dysthymia (95%) and/or exhibited elevated levels of depressive symptoms, i.e. Beck Depression Inventory >14 (5%) (2) were sufficiently fluent in Dutch, and (3) were receiving concurrent outpatient treatment for their depression by a qualified local therapist or psychiatrist (eight outpatient treatment facilities). Psychiatric comorbidity was allowed with the exception of psychotic disorder, manic depression and/or substance dependence. About sixty percent of the infants were first-borns; mean age of 5.5 months, forty percent had one or two siblings, with a mean age of 3.9 years (see Table 1 and 2). Candidates had either been referred for participation to the programme by their local therapists or had responded to appeals in national newspapers, women's and parenting magazines, or websites. The mothers who agreed to participate in the study all signed an informed consent form which explained the randomization to the programme and with which they also gave the researcher permission to obtain information from their therapists.

Table 1 Mean ages, standard deviation, and age ranges for the Infants at pre-test, post-test, and follow-up test

Age infant in months (n =71)	Mean	Standard Deviation	Range	Minimum	Maximum
At pre-test	5.5	3.1	11.0	1.0	12.0
At post-test	12.1	4.4	17.1	5.2	22.2
At follow-up test	18.8	4.2	16.4	12.2	28.6

Figure 1 shows a flow chart of the participant progress per phase of our randomized trial, which had a recruitment period of 2.5 years. Including the follow-up assessment, the total trial period was 3.5 years. Of the 95 women referred to the study prior to the pretest assessment, 17 did not meet the inclusion criteria, and 3 refused to participate. Of the 85 participants who had initially entered the study, 14 (16%) dropped out in the course of the study. An independent-samples t-test was used to compare the mothers who completed the study condition (n = 71) with those who dropped out during the study (n = 14; significance level, $p < 0.05$, two-tailed,). There were no differences between the women who completed the study and those who dropped out in terms of demographics or mother and infant measures, apart from educational level, with the dropouts having a lower educational level ($p < 0.05$). At baseline, the demographics and scores on mother and infant measures of the experimental and control groups of the participants who completed the study were comparable (see Table 2). The recruitment procedure and the study protocol were approved by the medical ethics committee of the Radboud University Nijmegen, where the research was coordinated.

Figure 1 Flow chart of the study's progress, detailing participant numbers during recruitment, inclusion, allocation and experimentation processes

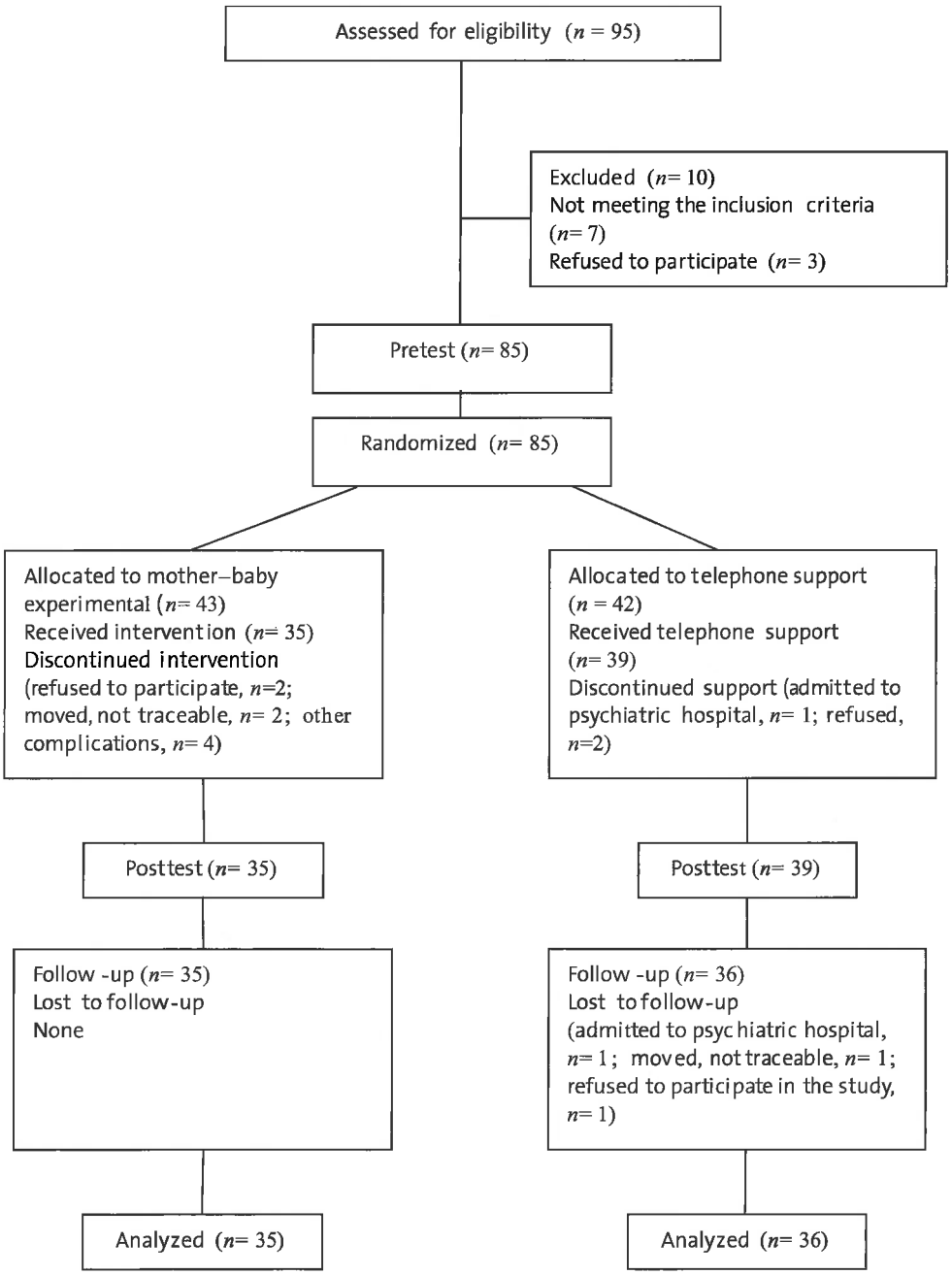

Table 2 Baseline and completer demographics and characteristics of the mothers and Infants for the control and experimental groups[1]

		Control Group		Experimental Group	
		Baseline (n =43)	*Completers(n=36)*	*Baseline (n =42)*	*Completers (n=35)*
Maternal characteristics					
Mean age (in years)		30.4 (3.9)	30.4 (4.1)	29.6 (3.8)	29.9 (3.6)
Living with partner (%)		85.7	89.9	95.2	94.2
Employment outside the home (%)		42.9	44.4	45.2	44.1
Education level (%)	*Low*	26.2	22.2	23.8	23.4
	Middle	42.8	44.4	57.6	58.8
	High	31.0	33.4	19.1	17.8
Family Income (%)	*Low*	22.5	20.6	18.4	13.3
	Middle	50.0	50.0	60.5	63.4
	High	27.5	29.4	21.1	23.3
Dutch nationality (%)		97.6	80.6	95.2	88.6
Level of depression (BDI)		23.1 (9.3)	22.0 (9.3)	25.0 (11.4)	25.3 (12.2)
Earlier episode of depression (%)		51.2	52.8	57.1	64.7
Duration of depression (%)	*0-3 months*	16.7	19.4	14.3	14.7
	3-6 months	28.6	27.8	19.0	17.6
	> 6 months	54.8	52.8	66.1	67.6
Presence of comorbidity		66.7	58.3	73.8	70.0
Life events		1.6 (1.7)	1.4 (1.4)	.8 (.9)	1.0 (0.9)
Chronic problems		2.4 (2.3)	2.2 (2.2)	2.5 (2.1)	2.7 (2.2)
Infant characteristics					
Mean age at pretest (in months)		5.4 (2.3)	5.2 (2.9)	6.0 (3.2)	5.8 (3.2)
Female (%)		38.1	36.1	42.9	42.9
First born (%)		52.4	50.0	66.7	67.6
Birth weight (in grams)		3193.6 (678.2)	3339.0 (557.5)	3250.6 (732.3)	3213.0 (667.4)
Perinatal complications		.44 (0.5)	.44 (0.5)	0.15 (0.5)	.58 (0.5)

[1] Data are given as Mean (SD) unless otherwise indicated.

Design and intervention

According to the randomized controlled study design, and after a baseline assessment, participants were randomly assigned to the intervention group or the control group. The two groups were balanced in sets of ten, each with a computer-generated randomization sequence.

Experimental group

Mother–infant pairs who were assigned to the experimental group which received the mother–baby intervention, an outline of which is given below.

One of fourteen home-visitors (qualified prevention specialists) affiliated with one of the regional Community Mental Health Centres, all with a master's degree in psychology or social psychiatry and graduate or postgraduate training in prevention or health education, visited the depressed mothers and their infants at home, where they recorded mother–child interaction on videotape, usually involving the mother bathing her baby. A multi-disciplinary team consisting of specialists in infant mental health care and adult psychopathology associated with the home-visitor's treatment centre subsequently analyzed the videotape, focusing on the mother's sensitivity to her infant's signals and needs. Based on their analysis of the videotaped interactions and the experiences of the home-visitor, the team jointly defined the specific aims of the intervention, the primary objective always being the enhancement of the mother's sensitivity to the signals and needs of the child. Subsequently, the home-visitor chose the method(s) best suited to achieve these goals and fine-tuned the intervention to the mother's needs. Video-feedback was used as the core intervention method, provided parental consent was obtained. In the application of video-feedback there was room left for tailoring the method (e.g. its dosage, other techniques like baby massage, modeling) to the individual mothers and their context.

During each home-visit, the home-visitor monitored and videotaped mother and child during everyday activities, such as bathing or feeding the baby. Subsequently, while watching the tapes together, the home-visitor discussed the interactions with the mother, or if present, both parents. The mother was encouraged to expand her range of appropriate communicative behaviours, using the videotapes to show her when to respond to the baby's eye-contact, movements, or sounds.

For example, one tape showed a lack of eye-contact between mother and infant. While watching the tape, the mother reported that her child was not interested in her, but was instead always looking at his dad. The tape, however, also showed some instances of the child looking at his mother, which she had not noticed.

When the images of such moments were explicitly pointed out to the mothers, they usually recognized that the child was trying to make contact. This made them

aware of possible contact opportunities. Subsequently, the mothers were asked to practice responding to their child's contact initiatives. The father, when present, was encouraged to support his wife in her interaction with the child. In addition to the video observations, one or more of the following four techniques were used, depending on the needs of the parents:

1. *Modeling*. The mother was further supported in her parenting role by having her adopt new interactive techniques through modeling. The home-visitor demonstrated how the mother could use various techniques to respond to the infant's contact initiatives. For example, the home visitor showed how imitating the infant's sounds or facial expressions elicited the child's attention and excitement. The mother was encouraged to do the same and thereby experience the reinforcement of her infant's positive response.
2. *Cognitive restructuring*. The home-visitor encouraged the mother to try and change her negative way of thinking about the child and her competence as a parent. Techniques from cognitive behaviour therapy were used to explain to her that negative thinking can make her depressive feelings towards herself and her infant persist. For example, one of the mothers told the home-visitor that her 6-months-old son was afraid of her. When she came into his bedroom, he extended his hands to her while fretting or crying, which she interpreted as a sign of anxiety or resistance. Having noticed the mother's negative interpretation of the child's signals, the home-visitor encouraged her to label the child's behaviour in a more appropriate and positive way.
3. *Practical pedagogical support*. The home-visitor provided the mother with information on how to deal with the baby's crying, sleeping and eating problems.
4. *Baby-massage*. This massaging technique, which was often introduced during modeling, aims to improve the quality of the physical contact between the mother and her infant. It encourages her to touch her child more tenderly and may help her make her baby feel more comfortable (Field, 1995). In the Netherlands, baby-massage courses are offered by infant healthcare centres. Mothers were encouraged by the home-visitor to participate in these courses.

In the remainder of the sessions, the parents were given the opportunity to familiarize themselves with these newly acquired patterns of positive interaction. Through practice, the mothers and fathers learned to adopt new and more sensitive interactive behaviours. At the final visit, a plan was made with instructions that should help the parents sustain the positive interactions in the future. Three months after the last home-visit, the prevention worker visited the family once again to observe the mother–child interaction and to see whether the progress made during the intervention had been preserved. Any problems or questions the

parents might have were discussed and, if needed, additional advice or counseling was offered.
The intervention comprised a total of 8 to 10 home-visits, each lasting approximately 60 to 90 minutes. Initially, visits were conducted weekly, but during the course of the programme this was decreased to one visit every two weeks. Thus, full implementation of the programme, from the first contact through to the last home-visit, took 3 to 4 months. All home-visitors used a standardized protocol and were trained by the first author and a child therapist with extensive experience in implementing the programme (Van Doesum et al., 2005). A manual, a video-tape and a training programme for home-visitors are available, all in Dutch.

Control group
The mothers who had been assigned to the control group received a minimal intervention involving three telephone calls, each lasting a maximum of 15 minutes, by one of the eight child therapists, during 3 consecutive months. In the phone calls, the mothers were supported with practical parenting advice. The therapists were instructed not to focus on the actual mother–child interaction but to restrict their support to general information about child-rearing skills.

Procedure
The assessments were conducted by one of the three trained researchers. The pretest was conducted during the first assessment at home and consisted of a video recording, an interview and a questionnaire. Prior to the pretest, the mothers were sent a general questionnaire, including items about family demographics, duration of depressive symptoms, chronic stressors, the number of negative life events, and feelings of parental competence, as well as a social support list, with the request to complete them before the visit. The mothers were assessed for depression by means of structured diagnostic interviews (MINI, Sheenan, et al., 1998) and the Beck Depression Inventory (BDI, Beck, Rush, Shaw & Emery , 1979). Information about comorbidity was also retrieved from the MINI. After the interview, the mother's behaviour was recorded on videotape for 15–20 minutes while she was bathing her baby.
There were two posttests, both conducted at home, for both of the groups. The first posttest was conducted within two weeks of completion of the mother–baby intervention or the minimal intervention (i.e., 3 to 4 months after the pretest). Just as for the pretest, a general questionnaire was sent by mail, and a 15-minute video recording of the mother–child interaction was made; this time not during bathing, but during mother–infant free play with toys. The second posttest, the follow-up test, was done at home six months later after the posttest. Again, the mothers

received a general questionnaire and were videotaped for 15 minutes while playing with their infant at home. The mothers also completed an oral questionnaire on their child's socio-emotional functioning. After having observed the child for 2 hours, the researcher completed the 90-item version of the Attachment Q-set (AQS, Waters, 1995) describing the child's secure-base behaviour. Table 2 shows the mean ages, standard deviations, and age ranges for the infants at pre-test, post-test, and follow-up. In sum, the quality of the mother–child interaction was assessed at each of the three assessments, whereas the children's attachment security and socio-emotional functioning were only assessed at the follow-up test.

Instruments

Quality of the mother–infant interaction. The videotaped episodes of mother–infant interaction were rated using the Emotional Availability Scales, Infancy to Early Childhood Version up to 4 years (EAS, Biringen Robinson & Emde, 1998). For very young children (0–6 months), we used the adapted version of the EAS for younger children. The EAS includes six scales, viz., parental sensitivity, structuring, intrusiveness, hostility, and child responsiveness and involvement. In this study, only the scales for parental sensitivity and child responsiveness and involvement were used, because the intervention focused on improving these aspects of mother–child interaction. The parental sensitivity scale is a 9-point scale that refers to a variety of parental qualities tapping a parent's ability to be warm and emotionally connected with her child. The 7-point child responsiveness scale evaluates an infant's willingness and openness to interact with its mother (e.g., responding to her bids) and assesses the degree of pleasure the infant exhibits when doing so. The child involvement scale, which is also a 7-point scale, assesses the degree to which a child initiates interaction with its mother and invites her to interact. Each tape was independently rated by four trained observers blinded to the group assignment, viz., the first and second authors, the latter having been trained by one of the authors of the EAS (J. Robinson), and two graduate students trained by the second author. Reliability was checked in a random sample of 15 different interaction recordings evenly distributed across the assessments and various age levels of the infants. The inter-rater reliabilities, expressed as Cohen's Kappa, exceeded .85 for all scales, indicating excellent agreement Several studies have shown good reliability and validity (Aviezer, Sagi, Joels & Ziv, 1999; Biringen, et al., 2005; Easterbrooks, Biesecker & Lyons- Ruth, 2000). The observers were blinded to group assignment and other relevant data.

Child attachment security. The Attachment Q-set (AQS, version 3, appropriate for children aged 12 to 48 months) was used to describe the infants' attachment

behaviour in the home setting (Waters, 1995). In a recent meta-analysis, the widely used AQS was shown to be a reliable and valid measure of infant attachment security (Van IJzendoorn, Vereijken, Bakermans-Kranenburg & Riksen-Walraven, 2004). After having observed a mother and child at home for two hours, the trained observer, again unaware of the group assignment, arranged the 90 descriptive statements in a rectangular forced nine-category distribution according to the evaluated applicability of each item for the particular child. A security score was obtained by correlating the child's Q-sort description with the criterion sort provided by experts for a perfectly secure infant. The security scores could range from -1.00 for a most insecure infant to +1.00 for a perfectly secure infant. The observers had been trained by expert researcher Hedwig van Bakel, who has extensive experience with the application of the AQS, until an adequate inter-rater reliability of .75 was reached. Reliability checks during the study showed that Cohen's Kappa's for five independent sorts for the same observations all exceeded .75. The observers who applied the AQS were not involved in rating the mother–child interaction and were blinded to group assignment and other relevant data.

Infant socio-emotional functioning. The Infant Toddler Social and Emotional Assessment (ITSEA), a parental report instrument for 12- to 36-month-old children (Carter, Briggs-Gowan, Jones & Little, 2003), was employed to assess the socio-emotional problems and competence in our infant sample. This scale assesses four broad domains of socio-emotional functioning: (1) internalizing symptoms (e.g., depression–withdrawal), (2) externalizing symptoms (e.g., aggression, activity), (3) dysregulation (sleeping and eating difficulties), and (4) competence (e.g., empathy). The ITSEA includes 166 items rated on a 3-point scale: (0) not true/rarely, (1) somewhat true/sometimes, and (2) very true/often. A "no opportunity" code allows parents to indicate that they have not had the opportunity to observe certain behaviours (e.g., behaviour with peers). The validity and reliability of the ITSEA have been demonstrated in earlier research (Carter et al., 2003). In the present study, Cronbach's alphas for the four domains were adequate: =.68, .88, .80, and .84, respectively.

Depression and comorbidity. Depression and comorbidity were assessed by means of the Dutch version of the Mini International Neuropsychiatric Interview (MINI, Sheenan et al., 1998; Overbeek, Schruers & Griez, 1997). The MINI is a short diagnostic interview to explore 17 axis-I diagnoses according to the diagnostic criteria of the Diagnostic and Statistical Manual DSM-IV (APA, 1994). The inter-rater reliability has been found to be satisfactory (Sheenan et al., 1998).

Severity and duration of depressive symptoms. The Beck Depression Inventory (BDI) is a 21-item self-report questionnaire to assess the level of depressive symptoms during the past week (Beck et al., 1979). The BDI reliably discriminates between clinically depressed and non-depressed persons. BDI cut-off scores for depression severity are as follows: a score < 10 signifies no or minimal depression, 10–18 mild to moderate depression, 19–29 moderate to severe depression, and 30–63 severe depression (Beck, Steer & Garbin, 1988). The BDI's psychometric properties have repeatedly been reported to be good. The average Cronbach's alpha for non-psychiatric samples is .82 (Richter, Werner, Kraus & Sauer, 1998). In our sample, an α of 0.89 was found.
To estimate the duration of the depression, the participants were asked to indicate in the general questionnaire of the pretest how long they had been experiencing depressive symptoms. The four options were: less than 3 months; from 3 to 6 months; from 6 to 12 months; and more than 12 months.

Stressful life events and long-term difficulties. Both the number of chronic stressors and the number of negative life events in the past month were assessed by means of an 11-item checklist derived from a Dutch questionnaire for life events, the Survey of Recent Life Experiences (SRLE) and the long-term difficulties questionnaire (LLM, De Jong, Timmerman & Emmelkamp, 1996). The areas covered by these two instruments were pregnancy, delivery, infant health, relationships with the partner, family, others, bereavement, divorce, family health, financial situation, housing, employment, legal matters, and other miscellaneous problems.

Statistical analyses

The effects of the intervention on the quality of the mother–child interaction were analyzed for the three assessments and the level of depression using a General Linear Model with repeated measures (significance level $p < 0.05$). Independent-samples *t*-tests were used to compare the average infant attachment security and socio-emotional functioning in the experimental and control groups (significance level $p < 0.05$).

4.3 Results

Descriptive statistics and relationships of the study variables

Table 3 presents the intercorrelations and descriptive statistics of the outcome variables at pretest and follow-up test. The posttest correlations were not included because the correlations were similar to those in the follow-up test for the three dimensions of mother–child interaction. The distribution of the scores for internalizing symptoms showed moderate skewness, which is why the variable

Table 3 Correlations, means, standard deviations, and ranges of outcome variables for the pretest and follow-up assessments (n = 71)

Outcome variable	1	2	3	4	5	6	7	8	9	10	11	Mean	SD	Min-Max
Quality of mother–child interaction														
Pretest														
1. Maternal sensitivity	-											4.35	2.02	1 - 8
2. Child responsiveness	.65**	-										3.87	1.73	1 - 7
3. Child involvement	.63**	.87**	-									3.73	1.83	1 - 7
Follow-up test														
4. Maternal sensitivity	.37**	.25*	.21*	-								4.39	2.02	1 - 8
5. Child responsiveness	.23*	.24*	.20*	.77**	-							4.06	1.66	1 - 7
6. Child involvement	.17	.27*	.21*	.73**	.91**	-						3.90	1.86	1 - 7
Attachment at follow-up test														
7. Attachment security	.22*	.21*	.15	.36**	.36**	.37**	-					.30	.28	-.27 - .75
Child socio-emotional functioning at follow-up test														
8. Externalizing	-.15	.08	-.01	-.05	.12	.13	-.45**	-				.59	.34	.04 -1.67
9. Internalizing [1]	.05	.11	.13	.12	.15	.14	-.03	.22*	-			-.42	.19	-.85 - .06
10. Dysregulation	-.25*	-.10	-.08	-.24*	-.14	-.11	-.39**	.65**	.30**	-		.47	.26	.06 - 1.32
11. Competence	.07	.18	.06	.31**	.36**	.43**	.44**	-.09	.07	.19	-	1.31	.31	.53 - 1.89

Note: * $p < .05$, ** $p < .01$, one-tailed

[1] correlations after the scores had been transformed to normality

was normalized by means of a log transformation. All other variables were normally distributed. The mother–child interaction variables were concurrently correlated both at the pretest and the 6-month follow-up test, and showed comparable correlations over the three measurements. The externalizing, internalizing, and dysregulation scores reflecting infant socio-emotional functioning were all significantly interrelated. Competence, the fourth scale for infant socio-emotional functioning, was unrelated to the other scales. Infant attachment security proved significantly related to the mother–child interaction variables at the follow-up test and to three of the four socio-emotional functioning scales, with the exception of the internalizing scale.

Table 4 Means and standard deviations for the mother–child interaction scores and maternal depression for the experimental and control groups at the three assessments

	Pretest M (SD)	Posttest M (SD)	Follow-up test M (SD)
Intervention group (n = 35)			
Maternal sensitivity *(scale 1-9)*	4.08 (2.03)	4.82 (1.78)	5.18 (2.01)
Child responsiveness *(scale 1-7)*	3.86 (1.63)	4.26 (1.48)	4.60 (1.77)
Child involvement *(scale 1-7)*	3.66 (1.83)	3.74 (1.83)	4.57 (1.91)
BDI score	25.3 (12.2)	18.9 (11.0)	17.2 (11.9)[1]
Control group (n = 36)			
Maternal sensitivity *(scale 1-9)*	4.63 (2.01)	3.79 (1.86)	3.63 (1.76)
Child responsiveness *(scale 1-7)*	4.00 (1.87)	3.18 (1.74)	3.52 (1.36)
Child involvement *(scale 1-7)*	3.87 (1.88)	2.79 (1.91)	3.25 (1.59)
BDI score	22.0 (9.3)	17.2 (9.3)	15.2 (9.8)[1]

[1] $p < 0.01$ for reduction of level of depression over time for each group

Effects of the intervention on the mother-infant interactions and the level of depression

Table 4 shows the means and standard deviations for the two groups at each of the three assessments, for each dimension of the mother–child interaction we evaluated. A General Linear Model (GLM) repeated-measures procedure was used for each dependent variable, with Group (experimental versus control group) as the between-subject variable and Time (pretest, posttest and follow-up) as the within-subject variable. A significant Group x Time interaction effect showed the effect of the intervention on the mother–child interaction to be significant

for all three dimensions: maternal sensitivity, F (2, 68) = 13.06, p <0.01, η^2 = 0.28; child responsiveness, F (2, 68) = 3.88, p = 0.03, η^2 = 0.10; and child involvement, F (2, 68) = 4.85, p = 0.01, η^2 = 0.13. The effect of the intervention on the mother–child interaction is graphically presented in Figure 2.

Figure 2 Mean scores for maternal sensitivity, child responsiveness, and child involvement for the experimental and control groups at the three assessments

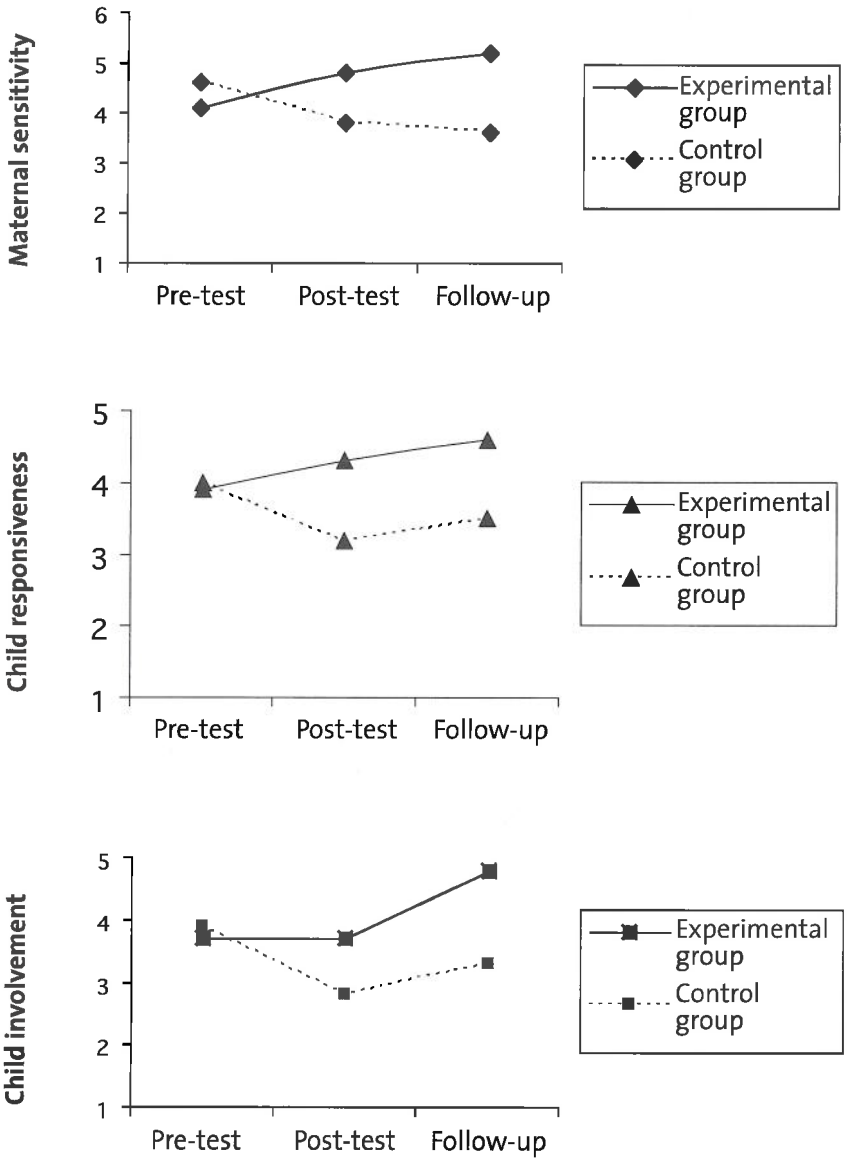

Table 4 shows that the level of depression decreased over time for both the experimental and the control group. A GLM for repeated measures with the BDI scores as the dependent variable, the experimental versus control group as the between-subjects factor, and repeated measures time as within-subject variable revealed no significant difference in level of depression between the groups. Furthermore, the analysis showed a significant reduction over time in the level of depression, both in the experimental group and in the control group.

Differences between the Conditions as regards Infant Attachment Security
Table 5 shows the means and standard deviations of the AQS security scores for the experimental and control groups. The AQS correlations were already normally distributed.. A *t*-test for independent samples yielded a significant difference between the two groups at follow-up: t (69) = -1.98, p= 0.03. As expected, the infants in the experimental group had significantly higher scores for attachment security in the follow-up assessment than the children in the control group.

Difference between the conditions as regards Infant Socio-Emotional Functioning
The effects of the intervention on the four aspects of the children's socio-emotional functioning are listed in Table 5. A *t*-test for independent samples revealed that the children in the experimental group were significantly more competent at the follow-up test than the children in the control group: t (69) = 2.64, p< 0.01. No significant differences were found for the other three domains, i.e. externalizing, internalizing, and dysregulation symptoms (Table 5).

Table 5 Means and standard deviations for attachment security and child socio-emotional functioning in the experimental and control groups, and *t*-values for the differences

	Experimental group (n = 35) M (SD)	*Control group (n = 36)* M (SD)	*t- values*
Attachment			
AQS security	.36 (.25)	.23 (.30)	1.98*
Child socio-emotional functioning			
Externalizing	.60 (.39)	.57 (.30)	-.34
Internalizing	.45 (.23)	.39 (.16)	-1.29
Dysregulation	.46 (.26)	.48 (.26)	.33
Competence	1.40 (.28)	1.22 (.30)	-2.64**

* $p < .05$, **$p<.01$, one-tailed

4.4 Discussion and conclusions

In accordance with our first hypothesis, the mother–baby intervention proved effective in enhancing the quality of the mother–child interaction. This shows that a short, moderately intensive intervention can achieve a significant and relatively long-term preventive effect (6 months after the intervention) in a sensitive period of a child's development. Most importantly, the experimental group saw an increase in maternal sensitivity, which is one of the most important components of parenting known to predict positive outcomes in children (Teti & Candelaria, 2002; Bakermans-Kranenburg, Van IJzendoorn & Juffer, 2003). The 6-month follow-up also confirmed our second hypothesis, in that the experimental group had significantly higher scores for infant attachment security and social competence than the control group. The average attachment security score of the infants in the control group (M = .23) was comparable to the level that is characteristic of clinical cases (M = .21) (Van IJzendoorn et al., 2004). In contrast, in the experimental group the average infant attachment security score (M =.36) was at the level that is characteristic of the normal population (M = .32) (Van IJzendoorn et al., 2004). The same trend was observed for child competence: the mean score of the control group in this study (M =1.22) was significantly lower than that of the normal American population of children in the 18 to 23 months age range (M = 1.37, Carter et al., 2003). In the experimental group, on the other hand, the mean competence score (M = 1.40), proved comparable to the competence scores of the normal American population (see above). Although these scores cannot be assessed at the time these children were pretested, this suggests that the early mother–baby intervention prevented deterioration of infant attachment security and competence. It should be noted that because both attachment security and child competence cannot be validly assessed before age 1, only the mother–infant interaction was assessed at pretest. Given that the mothers and infants were randomly assigned to the experimental conditions, and given that maternal sensitivity, the most important determinant of attachment security (see De Wolff & Van IJzendoorn, 1997), did not differ between mothers in the experimental and control groups at pretest, it can be assumed that the significant group differences we recorded for attachment at the follow-up test reflect an effect of the intervention. The conclusion about the effect of the intervention on the children's competence should be treated with more caution, however. We did not find any effect on the other domains of the child emotional functioning. Furthermore, it should be noted that the instability of infant socio-emotional functioning which has often been reported may have accounted for our failure to find intervention effects in the domains of externalizing, internalizing, and dysregulation symptoms.

Contrary to our expectations, we failed to find a difference between the two groups

for the other three domains of infant socio-emotional functioning (externalizing, internalizing, and dysregulation). This might be attributed to the relatively short interval between the end of the intervention and the follow-up assessment; 6 months may have been too short a period for any intervention effects on the children's socio-emotional problems to manifest themselves. A one-year follow-up might have been more appropriate to demonstrate treatment efficacy for these behavioural aspects. Another explanation is the children's development over time; because the child is maturing, it is more difficult to measure problem behaviour compared to non-problem behaviour (i.e. a child's competence).

The positive effect of the intervention on the mother–child interaction cannot be explained by the treatment of the maternal depression. All mothers received treatment (medication and/or therapy) for their depressive symptoms from the baseline assessment and throughout the intervention. The average BDI score decreased in both the experimental and control groups. Neither the pretest nor the posttest assessments revealed significant group differences in terms of BDI scores, which confirms the results of studies by Field (1998) and by Murray and Cooper (2003), who found that treatment and alleviation of depressive symptoms alone is not enough to improve the quality of mother–child interaction. Surprisingly, the intervention did not reduce the mothers' depression, although the BDI scores were significantly reduced in both groups at follow-up compared to the pretest values. The effect for the ongoing treatment for depression received by the intervention and control groups may have masked any improvement associated with the intervention.

It is intriguing that improvement of maternal sensitivity proved possible despite the severity of the mothers' depression. Other researchers have argued strongly that it is very difficult simply to "teach" depressed parents to be better parents. This line of reasoning assumes that depressed mothers do know how to parent but cannot do so because they are overwhelmed by sad affect, distress, and self-absorption. Our findings contradict this assumption to a certain extent, given that the intervention was implemented in combination with depression treatment. Whether the intervention would also be effective for mothers who are not in treatment is an open question, which could not be examined because our sample did not include untreated mothers.

Although the AQS is a well-acknowledged, valid instrument to measure attachment security (Carter et al., 2003), it has a drawback in that it does not distinguish between attachment *types*. In this respect it differs from the Strange Situation Procedure, which differentiates between secure attachment and three types of insecure attachment, namely insecure–avoidant attachment, insecure–ambivalent attachment, and disorganized attachment (Ainsworth, Blehar, Waters & Wall, 1978;

Main & Solomon, 1990). In clinical samples, disorganized attachment in particular has been found to be associated with maternal problems (Van IJzendoorn, Goldberg, Kroonenberg & Frenkel, 1992). Moreover, disorganized attachment has been shown to predict later child psychopathology (Lyons-Ruth & Jacobvitz, 1999). Thus, although our intervention showed positive differences in attachment security, it remains unclear if the programme also helped prevent attachment disorganization.

Another limitation of this study is that we did not screen the mothers for Axis II disorders, especially borderline personality disorder. Several studies have shown that interaction with borderline mothers has a serious impact on child problem development (Crandell, Patrick & Hobson, 2003: Weiss et al.,1996). The question whether the intervention would also be effective in the case of depressed mothers with a borderline personality disorder needs further research.

The evaluation of our early intervention programme has several interesting implications for clinicians. Compared to other existing programmes for depressed mothers and infants (Gelfand et al., 1996; Lyons-Ruth et al., 1990; Field, 1998), the current mother–baby intervention is short (comprising 8 to 10 home-visits) and has a distinctive key focus, i.e. the improvement of maternal sensitivity. The intervention is tailored to the mothers' strengths and needs and could serve as a candidate intervention for all depressed mothers and their babies. Finally, this mother–baby intervention is relatively easy to implement as part of the treatment that the mothers receive for their depression. Clinicians involved in adult care frequently do not see the need to refer depressed new mothers to a mother–baby intervention when the child does not (or not yet) exhibit problem behaviour. However, it should be stressed that infants of depressed mothers are at high risk of developing socio-emotional problems at a later stage in their lives and that the present intervention aims to *prevent* such problems. In this context, it is also worth mentioning that the intervention is now widely implemented in adult mental health care and adult psychiatry in the Netherlands, and comments concerning its efficacy have been favourable.

This by no means excludes the need for additional scrutiny, however. The present study warrants replication and the programme could benefit from a broader implementation in other settings (i.e. primary care) and from standardization. Thus, future research should address several topics. First, risk assessment research could help to better identify depressed mothers most at risk of poor mother-child interaction and insecure attachment. Second, further outcome research needs to establish which mothers and infants benefit most from the intervention; such mother–infant dyads could then be specifically targeted by the prevention programme. For example, it could be examined which of the different strategies

that the home-visitor offered, or which combination of strategies, was most effective in enhancing maternal sensitivity, and whether a longer duration would make the programme more effective. Another aspect that could be examined is whether the age of the child is important in determining the effect of the intervention. We explored whether the age of the children predicted the effect of the intervention on maternal sensitivity, but found no such effect. Future research needs to examine which participant and programme characteristics might act as effect predictors. Third, research is needed to test if adding new elements to the programme (e.g. strengthening extra-family support, or follow-up interventions) would further improve its outcomes.

Furthermore, the present group of mothers and children warrants follow-up to examine if the six-months intervention effects are maintained in later years, for example after the children have entered primary school. Such a study is now underway. Thirdly, a further study is being prepared that will focus on whether the current intervention (or a modified version) is suitable for application in a wider group of young mothers with other mental illnesses, such as psychotic disorders, borderline personality disorder, and substance dependence.

To conclude, replication of the present study is warranted to see whether the current results can be confirmed. If this report were to induce other countries to adopt the current intervention, it might create new opportunities for a further evaluation of its efficacy.

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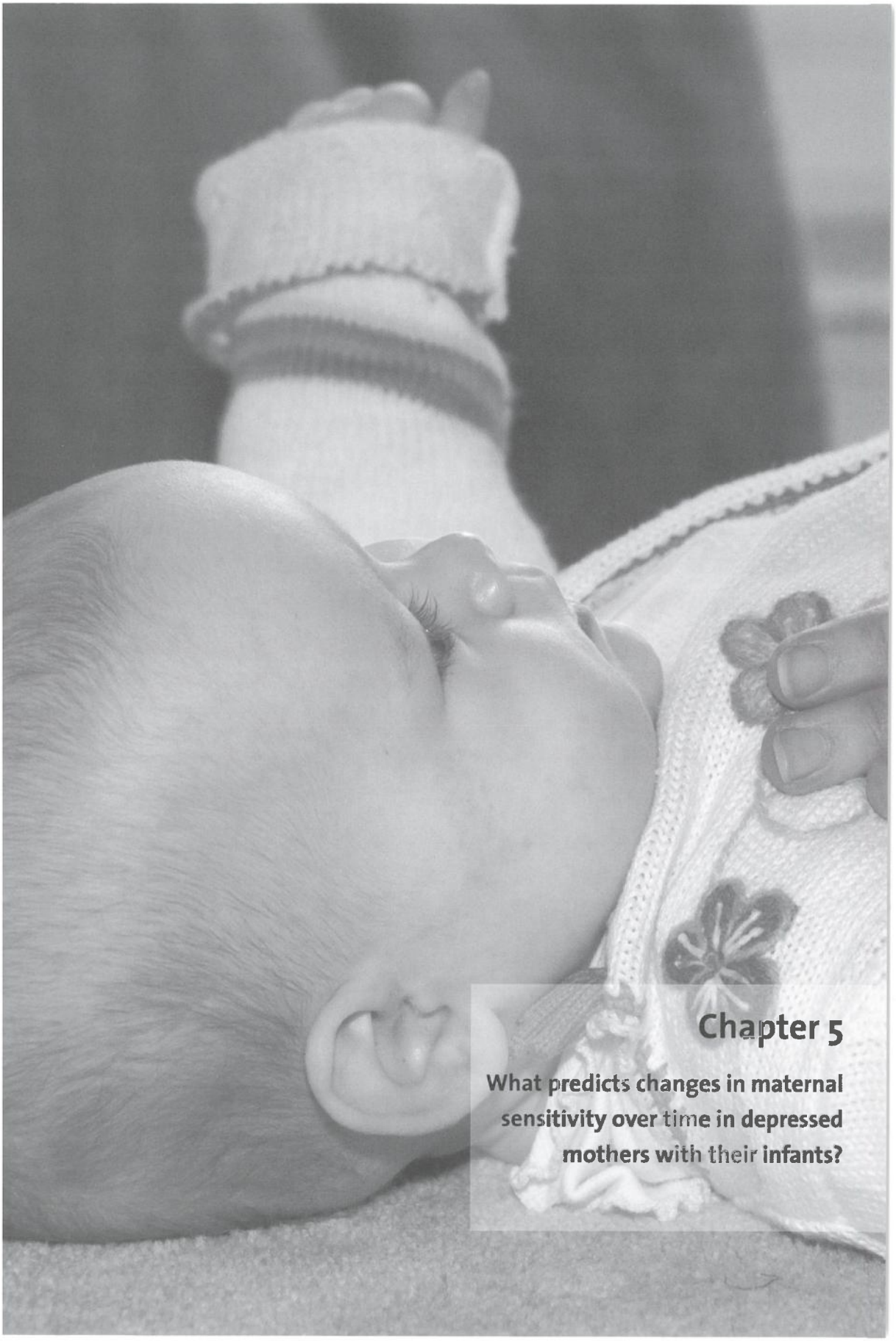

Chapter 5

What predicts changes in maternal sensitivity over time in depressed mothers with their infants?

This chapter was submitted for publication.

Enhancing the efficacy of preventive interventions and specifying conditions under which interventions will be most effective requires identification of effect predictors. This study explored the value of pre-intervention participant characteristics in predicting changes in maternal sensitivity over time for depressed mothers with infants. The sample consisted of 71 depressed mothers and their infants, who participated in a controlled efficacy study on a mother-baby intervention to improve mothers' sensitivity and their infants' secure attachment. Eleven pre-intervention characteristics were identified as possible predictors of the effect of the intervention. The number of factors was reduced by applying a principal factor extraction with varimax rotation on these characteristics. The resulting factor scores were used as predictor variables. A regression analysis was used to predict the change in maternal sensitivity between pre-test and follow-up test. The factor analysis yielded three predictor factors, labelled unfavourable maternal demographics, depression-related risk factors and life stress. Higher depression-related risk and more unfavourable maternal demographics were positively related to changes in maternal sensitivity, while exposure to high levels of life stress was negatively related to changes in maternal sensitivity in both the intervention and control groups. The mother-baby intervention can benefit depressed mothers with depression-related risk factors and unfavourable demographics. Depressed mothers in the intervention group who were exposed to high levels of life stress showed less improvement in maternal sensitivity than those with low levels of stress. These results may have important implications for preventive interventions. A tailored intervention is suggested for depressed mothers with a high exposure to life stress.

5.1 Introduction

This paper presents an explorative study on pre-intervention participant characteristics as effect predictors of an intervention programme for depressed mothers and their infants. The so-called Mother-Baby Intervention is theory-based and designed to reduce the risk among infants of depressed mothers to develop serious mental health problems, by improving the quality of the mother-child interaction, particularly maternal sensitivity (Van Doesum, Hosman & Riksen-Walraven, 2005). A previous study found the mother-baby intervention to be effective in improving maternal sensitivity at post-test immediately after the intervention, and at follow-up six months later (Van Doesum, Riksen-Walraven, Hosman, Hoefnagels, submitted). However, as is common in prevention and treatment studies (Jane-Llopis et al., 2003), the interventions had a high level of outcome variation among targeted programme participants. A wide range of effect predictors has been suggested to explain such outcome variation (Hosman, 1999; Kumpfer, Alvarado & Whiteside, 2003; Nation et al., 2003). For instance, it

has been shown that the efficacy of preventive interventions is related to the level of individual risk, the age and the motivation of participants at baseline (Price, Van Ryn & Vinokur, 1992; Sandler, West, Baca, & Pillow, 1992; Smokowski, Fraser, Day, Galinsky, & Baccallao, 2004; Vinokur, Price, & Schul, 1995; Wilson, Lipsey & James, 2003). There has been an increasing number of studies discussing the complexity of outcome prediction in prevention. Recently, a conceptual framework was presented to guide the study of effect predictors and guidelines for effect management (Hosman & Engels, 1999; Llopis, Hosman, Jenkins & Anderson, 2003; Molleman, Peters, Hosman, Kok & Oosterveld, 2006).

Identification of effect predictors, especially participant characteristics and programme characteristics, is needed to enhance the efficacy of interventions and specify the conditions under which interventions will be most effective. The present study focused on participant characteristics. Knowledge of participant characteristics is important to define and segment target populations and to establish an optimal fit between programme and target population. Tailoring programme characteristics to the features of well-defined target populations and individual participants has proved an effective tool to improve programme outcomes (Barthelomew et al., 2001; Campbell and Quintiliani, 2006; Kreuter et al., 2003). From the perspectives of prevention science as well as prevention practice, there is a need for a better understanding of the determinants of outcome variation in terms of efficacy and effectiveness.

Earlier studies were first reviewed in search of participant characteristics at baseline that might serve as potential effect predictors. A literature search in Psycinfo and Medline yielded no published studies focusing on participant characteristics as effect predictors of preventive interventions for depressed mothers and infants. Bakermans-Kranenburg, Van IJzendoorn & Juffer (2003, 2005) conducted two meta-analyses on the predictors of change in maternal sensitivity and parent-child attachment in early intervention programmes for at-risk children. However, their analyses focused on programme characteristics and not on participant characteristics In the present study we examined the value of participant characteristics to predict changes in maternal sensitivity over time. We also examined whether the value of participant characteristics in predicting changes in maternal sensitivity was different for depressed mothers who did and those who did not participate in the mother-baby intervention.

5.2 Method

Participants

Participants were 71 depressed mothers and their infants aged between 1 and 12 months (28 girls, 43 boys; M= 5.5 months, SD= 3.1) who participated in a randomized

control trial on the effects of a mother-baby intervention to improve maternal sensitivity in depressed mothers with infants (Van Doesum et al., submitted). Fifty-eight percent of the children were first-borns; the remaining 42% had one or two siblings. Their average birth weight was 3264 g; 8% had a birth weight below 2500 g. In 50% of the cases, there were complications at birth. At the time of the study, all babies were healthy. The mothers were between 20 and 38 years of age (M= 30.1, SD = 3.8). Sixty mothers were of Dutch origin and 11 were immigrants or descendants of immigrants, from various origins (Turkish, Moroccan, Surinam, Portuguese and Australian). All immigrant mothers had the Dutch nationality and were able to speak Dutch. Most mothers shared their household with a partner; only five were single mothers. Based on their level of education and income, 50% of the mothers were classified as having an average socio-economic status, 25% as having a high status and 25% as having a low status. The participants were living in various parts of the country, both in urban and rural areas. On average, the mothers exhibited high levels of depressive symptoms: 61 mothers were diagnosed with a depressive episode, 6 with dysthymia and 4 with high levels of depressive symptoms. Sixty-four percent of the mothers had comorbidity, mostly involving anxiety disorders (68%). The demographics of the experimental and control groups were comparable at baseline

Design and procedure

The participants were randomly assigned to the intervention or control group (described below). Data were collected at three time points, namely at pre-test (T1), i.e., just before the start of the mother-baby intervention, at post-test (T2), i.e., within two weeks of completion of the mother-baby intervention, and at follow-up test (T3), i.e. six months after the post-test. A demographic questionnaire and the measurements for the predictor variables were administered at pre-test. At all three time points, mother-child interactions were video-taped for 15 minutes; at pre-test, this was done while the mother was bathing her baby, and at post-test and follow-up test during free play with toys.

Experimental condition: the mother-baby intervention. Participants in the experimental condition received the mother-baby intervention. This involved a home visitor (qualified prevention specialist) visiting the depressed mother and her infant at home, where he/she recorded the mother-child interaction on videotape. A multi-disciplinary team consisting of specialists in infant mental health care and adult psychopathology, who were associated with the home visitor's treatment centre, subsequently analyzed the videotape, focusing in particular on the mother's sensitivity to her infant's signals and needs. Based on their analyses of

the taped interactions and the report of the home visitor, the team jointly defined the specific aims for the intervention, the primary objective always being the enhancement of the mother's sensitivity to the signals and needs of the child. The home visitor then chose the strategies best suited to achieve these goals and fine-tuned the intervention to the mother's needs. Based on the video observations and the outcome of the discussion with the parents, the mother was encouraged to expand her range of appropriate communicative behaviours, and was shown when to respond to the baby's eye contact, movements or sounds. The father, when present, was encouraged to support his wife in her interactions with the child. In addition to the video observations, one or more of the following techniques were used, depending on the needs of the parents: modelling, cognitive restructuring, baby massage and practical pedagogical support. The intervention comprised a total of 8 to 10 home visits. For full details we refer to earlier publications (Van Doesum et al., 2005).

Control condition: minimal intervention. The mothers who had been randomly assigned to the control condition (n=36) received a minimal intervention involving three telephone calls, each lasting a maximum of 15 minutes, by a child therapist. These calls were evenly divided over 3 consecutive months. The phone calls were used to support the mother with practical parenting advice. The therapist had been instructed not to focus on the actual mother-child interaction but to restrict his/her support to general information about child-rearing skills.

Measurements

Outcome variable: maternal sensitivity. The video recordings of the bathing session (15 minutes) were rated using the 9-point sensitivity scale of the Emotional Availability Scales (EAS Infancy to Early Childhood Version up to 4 years; Biringen et al., 1998), with a score of 1, indicating very low sensitivity and a score of 9 indicating optimal sensitivity. For infants aged 0–6 months, we used the adapted version of the EA Scales for younger children. The sensitivity scale evaluates a variety of parental qualities, including affect, timing, flexibility, acceptance, conflict negotiation and the parent's awareness of their child's cues, as well as appropriate responsiveness. The key component is the parent's ability to be warm and emotionally connected with the child. Each tape was independently rated by four trained observers blinded to the group assignment, viz., the first and second authors (the latter having been trained by one of the authors of the EAS (J. Robinson), and two graduate students trained by the second author. Reliability was checked in a random sample of 15 different interaction recordings evenly distributed across the assessments and the various ages of the infants.

The inter-rater reliabilities, expressed as Cohen's Kappa, exceeded .85 for all scales, indicating excellent agreement

Participant characteristics

Demographic variables. Information about the presence of a partner, age, education level and family income was collected in the general questionnaire, which was administered by post. The education level ranged from low (1), i.e., elementary school only, to high (7), i.e., university degree. Family income ranged from 1 (less than USD 800 a month) to 5 (more than USD 2900 a month).

Level of depressive symptoms, depression and comorbidity. The Beck Depression Inventory (BDI; Beck et al., 1979) is a 21-item self-report questionnaire that assesses the respondent's level of depressive symptoms during the past week. High scores reflect high depression levels. The BDI discriminates between clinically depressed and non-depressed persons. The BDI's good psychometric properties have been repeatedly reported; its average Cronbach's alpha for non-psychiatric samples is .82 (Richter et al., 1998). In our sample, a Cronbach´s alpha of 0.89 was found at pre-test. Depression and comorbidity were assessed by means of the Mini International Neuropsychiatric Interview (MINI, Sheehan et al., 1998), using the Dutch version by Overbeek et al. (1997). The MINI is a short diagnostic interview to evaluate 17 axis I diagnoses according to DSM-IV criteria (APA, 1994). The inter-rater reliability has been found to be satisfactory (r = .75). Our study compared the results of the diagnostic interview with the diagnosis independently established by the respondent's therapist. Cohen´s Kappa for agreement about the diagnosis was .90

Social support. The Social Support List (SSL; Van Sonderen, 1993), a Dutch self-report instrument, was used to measure the frequency of supportive interactions as perceived by the respondent and the extent to which the support received corresponded to her needs. The original list comprises 34 items covering four dimensions. We restricted ourselves to three dimensions of emotional support in the present study: positive interactions (including day-to-day emotional support and emotional support in case of problems, 12 items), negative interactions (7 items) and lack of support: (12 items). High scores on the positive interactions scale and low scores on the negative interactions scale and on the lack of support scale indicate good social support. The reliability of the three SSL scales was satisfactory, with Cronbach's alphas of .92, .85, and .88, respectively, at pre-test.

Feelings of parental incompetence. To assess the mothers' feelings of incompetence in child-rearing we used the *uncertainty* subscale of the questionnaire designed

by Engfer and Garvranidou (1987). The *uncertainty* subscale includes 5 items that refer to the parent's feelings of insecurity and uncertainty in child-rearing. For each item, the mother was asked to indicate on a 3-point Likert-scale to what extent the item applied to her. High scores indicate more parental incompetence. Engfer et al. (1987) reported a Cronbach's alpha of .76 for the *uncertainty* subscale, and the present study found an identical internal consistency rate. Validity of the scale has been shown in several studies, and high correlations have been found with the quality of the parent-child interaction (Riksen-Walraven, Meij, Hubbard, & Zevalkink, 1996).

Stressors. Chronic stressors and negative life events in the past month were assessed by means of an 11-item checklist derived from the Survey of Recent Life Experiences, a Dutch questionnaire for Life events, and the Long-term Difficulties (De Jong et al., 1996). The present study used absence (0) or presence (1) of life events and absence (0) or presence (1) of long-term difficulties.

Reducing the number of predictors

Our study initially included 11 pre-intervention participant characteristics. In view of the relatively small sample size, a Principal Component Extraction with varimax rotation was performed on the pre-intervention participant characteristics to decrease the number of predictors in the analysis. The resulting component scores were used as predictor variables. Prediction analyses were performed on all participants, with intervention versus control group as a separate predictor. A hierarchical linear regression was carried out to predict the change in maternal sensitivity between pre-test and follow-up test.

5.3 Results

Descriptives

Table 1 shows the mean scores of the outcome variable 'maternal sensitivity at pre-test and follow-up test' for the intervention and control groups. Maternal sensitivity increased significantly in the intervention group and decreased significantly in the control group between pre-test and follow-up test (Van Doesum et al., submitted). The sizeable standard deviations show that there was considerable variation in maternal sensitivity at follow-up test and in changes in maternal sensitivity over time for participants in the intervention and control groups.

Table 1 Maternal sensitivity at pre-test and follow-up test and changes in maternal sensitivity in the intervention and control groups

Group	Maternal sensitivity Pre-test Time 1			Maternal sensitivity Follow-up test Time 3			Changes in maternal sensitivity Time 3 minus Time 1		
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
Intervention Group (*n* =35)	4.09	2.03	1 – 8	5.17	2.01	1 – 9	1.09	2.24	-6 – 4
Control Group (*n* = 36)	4.61	2.00	1 – 8	3.64	1.76	1 – 8	-.97	1.83	-5 – 3
Total (*n*= 71)	4.35	2.02	1 – 8	4.40	2.02	1 – 9	.04	2.28	-6 – 4

Table 2 shows the descriptive statistics of the eleven predictor variables at baseline. Since the distribution of the scores for presence of a partner was highly skewed, this variable was excluded from further analysis. T-tests on the predictor variables showed no significant differences between the control and intervention groups.

Table 2 Means, standard deviations and ranges for the pre-Intervention variables (n = 71)

Variable	Mean	SD	Min	Max
Maternal characteristics				
1. Level of depressive symptoms	23.87	11.15	10	52
2. Sense of parental incompetence: uncertainty	4.63	2.85	0	10
3. Level of education	4.27	1.86	1	7
4. Age	30.14	3.59	20	38
5. Comorbidity	.66	.47	0	1
Contextual characteristics				
6. Chronic stress	2.44	2.20	0	9
7. Life events	1.20	1.22	0	5
8. Social support: positive interactions	29.81	7.94	11	48
9. Social support: negative interactions	12.31	4.37	4	25
10. Social support: lack of support	21.63	7.23	11	36
11. Family income	3.61	1.20	1	5

Reduction of the number of predictor variables

Principal factor extraction with varimax rotation, using SPSS, was applied to the eleven participant characteristics for the total sample of 71 depressed women. A principal component extraction was used prior to the principal factor extraction to estimate the number of factors, presence of outliers and absence of multicollinearity and factorability of the correlation matrices. One variable, comorbidity, was excluded from the factor analyses because it did not show a significant correlation in the anti-image matrix. The results of the principal factor analysis are presented in Table 3. Three factors were extracted, which together explained 61.5 % of the variance. The first factor was characterized by a high negative loading of positive interactions and high positive loadings of lack of social support, negative interactions, uncertainty about parental competence and high level of depressive symptoms. Because this component represents variables which are commonly related to depression, the factor was labelled 'subjective indicators of depression-related risk', referred to below as 'depression-related risk'. For the second factor, high negative loadings were found for education level, family income and low maternal age, so the factor was labelled 'unfavourable maternal demographics'. The third factor was labelled 'life stress' because of its high loadings of exposure to life events and chronic problems.

Table 3 Results of the principal component analysis on the predictor variables

	Factor 1 Depression-related risk	**Factor 2** Unfavourable maternal demographics	**Factor 3** Life stress
% Variance explained	35.0	14.8	12.1
Social support:			
Lack of support	.82		
Positive interactions	-.71		
Negative interactions	.70		
Parental incompetence uncertainty	.69		
Level of depression	.69		
Low family income		.73	
Low level of education		.71	
Low age of mother		.71	
Life events			.85
Chronic problems			.74

Note: only loadings above .40 are reported

Predicting the effect of the mother-baby intervention

A hierarchical linear regression was performed on all participants to predict the changes in maternal sensitivity between pre-test and follow-up test (sensitivity at t3 minus sensitivity at t1) from the three predictor factors. In the first block, group assignment (control group versus intervention group) and the three predictor factors were simultaneously entered, while the two-way interaction terms between group assignment and each of the predictor factors were entered in the second block to examine whether the effect of the prediction factors differed between the two experimental conditions. Table 4 shows the results of the regression analysis. The significant proportion of variance explained by group assignment (20.7 %) reflects the intervention effect that was reported in Van Doesum et al. (submitted). In addition, each of the three predictor factors independently explained a significant share of the remaining variance in maternal sensitivity. Higher depression-related risk and more unfavourable maternal demographics were positively related to changes in maternal sensitivity, while exposure to high levels of life stress was negatively related to change in maternal sensitivity. Together, the three predictor

Table 4 Results of hierarchical linear regression analyses predicting the changes in maternal sensitivity

Variable	B	B-SE	β	*t*	ΔR^2
Prediction of changes in maternal sensitivity at follow-up test, *n* =71					
Block 1					
Group assignment	1.79	.45	.40	3.91**	20.7 %
Factor 1 Depression-related risk	.51	.22	.23	2.24*	4.9 %
Factor 2 Unfavourable maternal demographics	.57	.22	.25	2.53*	6.1 %
Factor 3 Life stress	-.45	.22	-.19	-2.02*	3.9 %
Block 2					
All 2-way interaction terms for group *x* predictor *factors*		-		NS	-
				Total R^2 =	35.6 %
				F(1,69) =	9.14

* $p < .05$,** $p < .01$

factors explained 14.9 % (R square) of the change in maternal sensitivity between pre-test and follow-up test. No significant group *x* risk factor interaction effects were found, even at a *p*-level of 0.10, which indicates that the change in maternal sensitivity was predicted by the same pre-intervention characteristics in both the intervention and control groups.

Finally, the same analysis described above was used to explore the impact of combinations of predictor factors. In the first block, group assignment and the three predictor factors were entered simultaneously, while the two-way and three-way interaction terms between the three predictor factors were added in the second block of the regression analysis. None of the interaction terms were found to explain any extra variance in the changes in maternal sensitivity over time.

5.4 Conclusion and discussion

To our knowledge, this is the first study exploring the role of participant characteristics as possible effect predictors in a preventive intervention for depressed mothers and infants. The three predictor factors resulting from a PCA on eleven participant characteristics were found to contribute independently

to the explanation of changes in maternal sensitivity. The predictor factors of changes in maternal sensitivity were the same in the intervention and control groups. Two predictors, i.e., high depression-related risk (implying lack of social support, uncertainty about parental competence and a high level of depressive symptoms) and unfavourable maternal characteristics (implying a low education level, low family income and low maternal age) were positively related to changes in maternal sensitivity over time. Given that maternal sensitivity improved in the intervention group and decreased in the control group, this indicates that high depression-related risk and unfavourable maternal characteristics predict more gain in the intervention group and less decrease in the control group. On the other hand, the third predictor factor, high level of life stress, was negatively related to the changes in maternal sensitivity over time. This implies that high levels of life stress predict less improvement in the intervention group and relatively greater decrease in the control group. The interactions between the three predictor factors did not add to the explanation of changes in maternal sensitivity over time.

Interestingly, the results of the study indicate that maternal sensitivity of mothers with high exposure to life stress decreased over time. One possible explanation why depressed mothers with a higher level of life stress showed less improvement in maternal sensitivity is that stressful life events and chronic stress may drain their energy, making them unable to invest in the relationship with their children. Such mothers may feel emotionally overwhelmed and this can interfere with the ability to respond to their infants' needs Another possible explanation for lower gains in mothers with higher life stress is that the mothers' therapists have difficulties treating highly stressed mothers. Several studies have discussed the process of counter-transference in therapists, for example, therapists treating patients with a post-traumatic stress disorder (Gelso & Hayes, 2002; Rosenberg & Hayes, 2002; Wilson & Lindy, 1994). Further research should look into the relation between recovery from depression and changes in maternal sensitivity over time among mothers with high levels of life stress.

Limitations

The first limitation of the study is the relatively small sample size Replication in a larger sample is needed to confirm the above results.

The predictors that were identified in this study were participant characteristics at baseline. The effect size of the intervention on maternal sensitivity can also be explained by other relevant effect predictors, i.e., programme-related effect predictors (number of home visits, tailoring to individual maternal needs) or risk factors present during the intervention (e.g. life events, problems in the relationship with the mother's partner). Furthermore, the number of participant characteristics

included in the present study was limited. Personality characteristics of the mothers may also have played a role in predicting the changes in maternal sensitivity over time. For example, maternal ego-resilience has been found to be related to maternal sensitivity in a community sample of mothers with infants (Van Bakel & Riksen-Walraven, 2002). Block and Block (1980) conceptualized ego-resilience as a general capacity for flexible and resourceful adaptation to external and internal stressors. By definition, an ego-resilient mother is able to cope resourcefully with stressful circumstances, which may foster her ability to provide supportive developmental experiences for her infant Therefore, low levels of ego-resilience might act as an additional risk factor for depressed mothers, particularly in cases with high levels of life stress.

The impact of possible changes in participant characteristics during the course of the intervention was not investigated. For example, our effect study showed that the depression level was equally reduced in the experimental and control groups (Van Doesum, et al. submitted). It is possible that there is a difference in the reduction of depression between mothers with high exposure to life stress and those with low life stress.

Clinical implications

If the findings of this study are replicated, the results may have several important implications for preventive interventions targeting depressed mothers and infants. Regardless of participation in the intervention, three factors predicted maternal improvement or deterioration over a 9-month period. The intervention group mothers showing the best prognosis were depressed mothers with a relatively high level of depression-related risks (lack of social support, uncertainty about parental competence and a high level of depressive symptoms), unfavourable maternal characteristics (low education level, low family income and low maternal age) and low level of life stress. Depressed mothers with high levels of life stress apparently need a specially tailored approach. One suggestion would be to screen the depressed mothers´ level of life stress before offering the mother-baby intervention. In the case of high levels of life stress, the mother-baby intervention can be offered at a later stage, after some effort has been invested to improve family or individual conditions so they might become less stressful. Another possibility in these cases would be to also focus on involving a co-caregiver (e.g. the father, an important other family member or a friend). Furthermore, the treatment of a depressed mother should also be accompanied by stress-management strategies training, after which the intervention can be offered at a later time.

Future research

Replication of the present study is warranted to investigate whether our results can be confirmed in a larger sample of depressed mothers participating in the mother-baby intervention or comparable interventions for this at-risk population. Furthermore, the range of possible effect predictors examined in this study is far from exhaustive. Research on effect predictors in this field is still in its early stages, and other relevant predictors, such as child characteristics, programme characteristics and the role of the depressed mothers' personality, need to be identified. In addition, the results of the present study can be compared with those of the earlier study of the same sample, which examined prediction of maternal sensitivity in depressed mothers (Van Doesum, Hosman, Riksen-Walraven & Hoefnagels, in press). This study found that the variance in sensitivity of depressed mothers was explained by level of education, feelings of parental incompetence, family income and young mothers with high levels of depressive symptoms and low-income mothers who feel insecure about their parental competence. Predictors of maternal sensitivity are not the same as predictors of changes in maternal sensitivity of depressed mothers. This interesting aspect needs further exploration in the future, in order to better define and segment of the target population and to establish an optimal fit between programme and target population. Another topic for research is the course of changes in risk factors during the intervention. If a programme is expected to have a generalized effect on additional risk factors, then monitoring these factors and their associations with the outcome variables would improve our understanding of the course of change. Finally, an effect study on the new approach for depressed mothers with high exposure to life stress may be an interesting option for further exploration of our findings.

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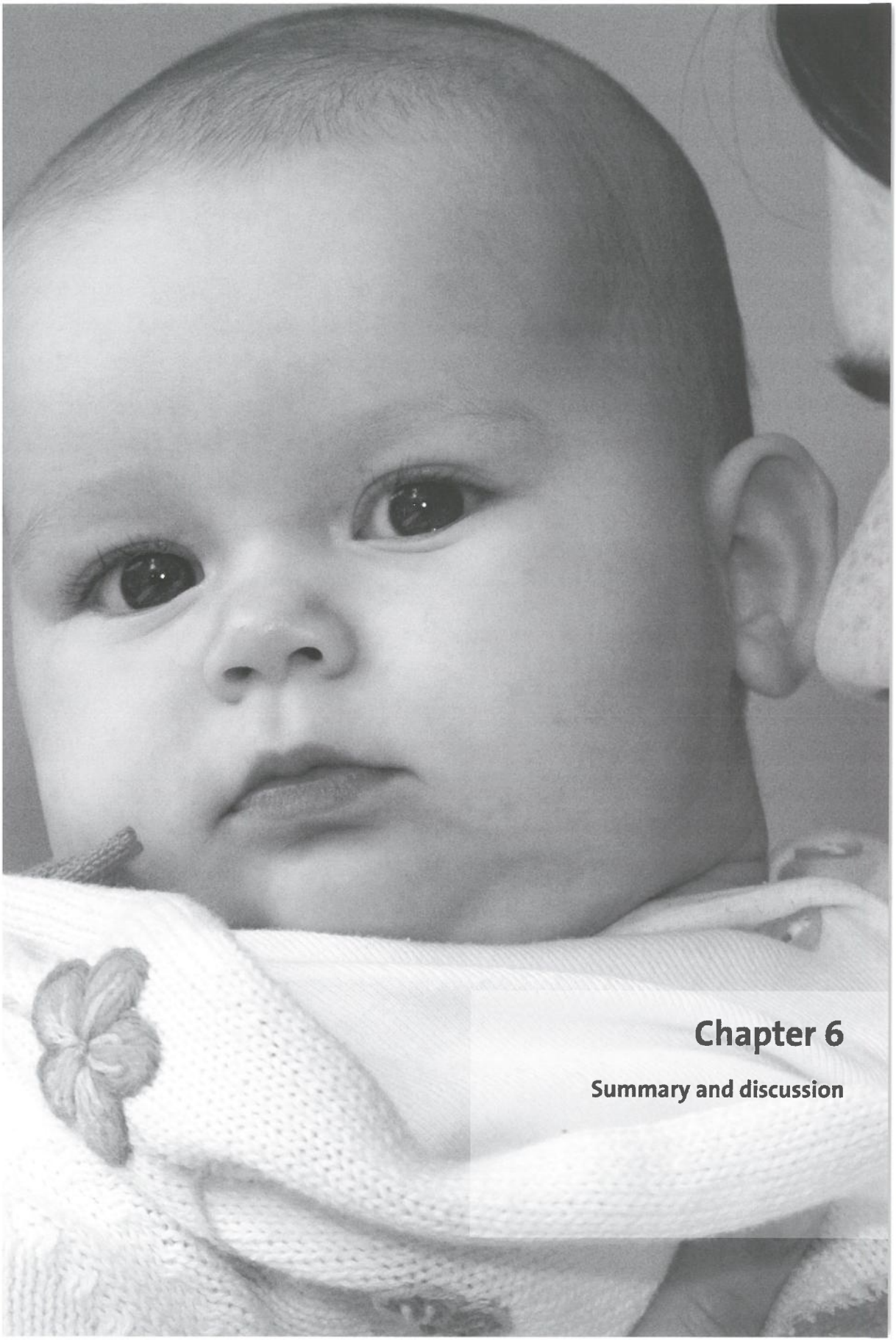

Chapter 6

Summary and discussion

The research discussed in the present thesis focused on the effectiveness of an early intervention for depressed mothers and their infants aged 1 to 12 months. The main aims of the research were: (1) to describe and present a theoretical and programmatic framework for an early intervention for depressed mothers with an infant, which was jointly developed by researchers and practitioners, (2) to search for maternal and contextual characteristics that could predict depressed mothers' sensitivity toward their infants, (3) to study the efficacy of the early intervention for depressed mothers with an infant and particularly to examine whether the quality of the mother–child interaction and the children's attachment security and socio-emotional functioning differed between depressed mothers who receive the intervention versus those who do not, and (4) to explain the difference between depressed mothers in the development of their sensitivity toward their infants over time. The data used in these studies were obtained from the dataset of 84 depressed mothers and infants at pre-test, 71 of whom also participated in the post-test and follow-up test.

6.1 Summary of the research project

Study 1. Chapter 2 presents the early intervention for depressed mothers of infants, as well as the theoretical model which it is based on. The chapter also reviews previous studies, which showed adverse effects of maternal depression in the offspring of depressed mothers. Infants of depressed mothers have been found to be more likely to develop mental and socio-emotional problems. Despite the increased risk of unfavourable developmental outcomes in the offspring of depressed mothers, the children are not all equally at risk of developing mental and socio-emotional problems. Three mechanisms have been proposed to help explain the effects of maternal depression on child outcomes: the early mother–child interaction, prenatal neurobiological transmission and the genetic mechanism of transfer. The mother–infant interaction practiced by depressed mothers differs in various respects from that by non-depressed mothers. During the interactions with their infants, depressed mothers tend to express fewer emotions and show more sad affect than non-depressed mothers. In addition, they are more intrusive, less involved, less responsive and less sensitive to the infant's signals. The new mother–baby intervention is based on a transactional model in which the mother–child interaction plays a key role. The transactional model includes a range of evidence-based parental, child and contextual risk factors that affect the quality of the interactions between depressed mothers and their infants and that contribute to both the vulnerability and resilience of the children during later childhood and adolescence.

The mother–baby intervention comprises a total of 8 to 10 home visits. A home visitor (qualified prevention specialist or mental health worker) visits the

depressed mother and her infant at home, where he or she records the mother–child interaction on videotape. A multi-disciplinary team consisting of specialists in infant mental health care and adult psychopathology who are associated with the home visitor's treatment centre subsequently analyze the videotape, focusing in particular on the mother's sensitivity to her infant's signals and needs. Based on their analysis of the taped interactions, the home-visitor then chooses the strategies best suited to achieve these goals and fine-tunes the intervention to the mother's needs. Based on the video observations and the outcome of the discussion with the parents, the mother is encouraged to expand her range of appropriate communicative behaviours, and is shown when to respond to the baby's eye-contact, movements or sounds. The father, when present, is encouraged to support his wife in her interactions with the child. In addition to the video observations, one or more of the following techniques are used, depending on the needs of the parents: modelling, cognitive restructuring, baby massage and practical pedagogical support. The mother–baby intervention has recently been introduced at the Dutch community mental health centres as part of a national multi-component programme to reduce the risk of psychiatric and social problems in the offspring of parents with a mental disorder.

Study 2. The second study (Chapter 3) examined the extent to which various maternal, child, and contextual characteristics, as well as the number of risk factors present, predicted maternal sensitivity in depressed mothers at pre-test, i.e., before the intervention started. Participants were 84 depressed mothers with their infants aged up to one year. Mothers were videotaped at home while bathing their children (± 15 minutes). The recordings were rated using the sensitivity scale of the Emotional Availability Scales (Biringen, Robinson & Emde, 1998). Three characteristics independently contributed to the variance in maternal sensitivity: maternal level of education, feelings of parental incompetence and family income. In addition, two subgroups of depressed mothers were found to be particularly at risk: young mothers with high levels of depressive symptoms and low-income mothers who feel insecure about their parental competence. Together, these factors independently and interactively explained 23% of the variation in sensitivity in our sample of depressed mothers. The mere number of risk factors explained 9.8 % of the variation in sensitivity. These results have implications for preventive interventions. Identifying groups specifically at risk for low maternal sensitivity at an early stage may contribute to more favourable outcomes of targeted interventions that focus on enhancing depressed mothers' maternal sensitivity and feelings of parental competence. The results imply that even chronically depressed mothers with comorbidity are able to be sensitive to their child as long as there

are protective factors present such as feeling competent as a parent, a reasonable educational level and sufficient family income.

Study 3. The third study (Chapter 4) examined the effect of the early mother–baby intervention described in Chapter 2 on the quality of the mother–child interaction, infant–mother attachment security and infant socio-emotional functioning in a group of depressed mothers with infants aged 1–12 months. A randomized controlled trial compared an experimental group (n = 35) receiving the intervention programme (8–10 home visits) with a control group (n = 36) receiving parenting support by phone (three telephone contacts with a child therapist). In the experimental group, maternal sensitivity (p = 0.001), child responsiveness towards the mother (p = 0.01) and child's involvement with the mother in interactions (p = 0.01) significantly improved as compared to the control group. A follow-up assessment six months after the end of the intervention showed that the difference in the quality of the mother–child interaction between the intervention and control groups was retained and also demonstrated that infants in the experimental group had significantly higher scores for attachment security and socio-emotional competence than infants in the control group.
The results strongly suggest that the intervention is successful in preventing early mother–child relationship problems that are considered important risk factors for adolescent and adult psychopathology. The study showed that a short, moderately intensive intervention can achieve a significant and relatively long-term preventive effect (6 months after the intervention) in a sensitive period of child development. Most importantly, the experimental group showed an increase in maternal sensitivity, which is one of the most important components of parenting known to predict favourable outcomes in children.
Surprisingly, the intervention did not contribute to a reduction in the mothers' depression, although the depression scores were significantly reduced in both groups at follow-up compared to the pre-test values. The effect of the ongoing treatment for depression received by both the intervention and control groups may have masked a possible reduction in depressive symptoms associated with the intervention.

Study 4. Enhancing the efficacy of preventive interventions and specifying conditions under which interventions will be most effective requires the identification of effect predictors. The final study (Chapter 5) explored the value of pre-intervention participant characteristics in predicting changes in maternal sensitivity over time for depressed mothers with infants. The sample consisted of 71 depressed mothers and infants who participated in the randomized controlled

effect study on the mother–baby intervention reported in Chapter 4. Eleven pre-intervention characteristics were identified as possible predictors of the effect of the intervention. The number of factors was reduced by means of a principal factor analysis on these characteristics. The factor analysis yielded three factors, labelled 'unfavourable maternal demographics', 'depression-related risk factors', and 'life stress'. The three factor scores were used as predictor variables in a subsequent regression analysis to predict the changes in maternal sensitivity between pre-test and follow-up test. Together, these three predictors explained 14.9% of the changes in maternal sensitivity between pre-test and follow-up test. Higher depression-related risk and more unfavourable maternal demographics were positively related to changes in maternal sensitivity, while exposure to high levels of life stress was negatively related to changes in maternal sensitivity. This was true for both the intervention group and the control group. Since the efficacy study had shown that maternal sensitivity increased in the intervention group and decreased in the control group, these findings indicate that high depression-related risk and unfavourable maternal characteristics predict a larger average increase in maternal sensitivity in the intervention group and a smaller average decrease in the control group. Higher levels of life stress, in contrast, predicted less average improvement in the intervention group and a relatively large average decrease in the control group. These results may have important implications for preventive interventions. A new, specially tailored intervention is suggested for depressed mothers exposed to high levels of life stress.

6.2 Concluding remarks

The research underlying the present thesis has yielded new and interesting findings on the efficacy of an early preventive intervention for depressed mothers and infants and on predictors of maternal sensitivity. The overall results of the studies warrant five concluding remarks about the importance of this study for the further development of prevention science and about the clinical implications for prevention practice.

1. Implementation of the mother–baby intervention and further research

This was the first controlled efficacy study in the Netherlands on a preventive intervention targeted at depressed mothers and their infants. First of all, it should be emphasized that, although positive effects of the intervention were sustained until six months after the intervention, the present group of mothers and children need to be followed up to establish whether the intervention effects are maintained in later years, for example after the children have entered primary school. Such a study is now underway. Although a replication of the present study is needed

in the future to confirm the robustness of the findings, and no long-term follow-up results are available yet, the favourable findings in terms of the quality of the mother–child interaction, attachment security and the infants' socio-emotional competence support the current large-scale implementation of the intervention in the Netherlands and other countries. Up to 50% (about 20) of the community mental health centres in the Netherlands are currently offering the mother–baby intervention in their communities, and we expect other centres to follow in the near future.

Notwithstanding these promising results in terms of implementation and programme efficacy, the number of depressed mothers with infants who receive the intervention has so far been relatively small. In 2005, about 400 depressed mothers nationwide were reached and received the intervention. In view of the total number of depressed parents with babies under the age of one (an estimated number of 20,000 per year) this figure is insignificant. The community mental health centres mainly reach mothers who have a serious depression and these mothers usually wait too long before seeking professional help for their depression. Some women do not tell anyone about their symptoms because they feel embarrassed, ashamed or guilty about feeling depressed when they are supposed to be happy. A wider application of the intervention at youth health care facilities (well-baby clinics), where virtually all Dutch mothers come with their babies for postpartum care, could considerably increase the number of mothers and babies who can be reached at an early stage. The first steps have been made to implement the mother–baby intervention in youth health care in the Netherlands. The plan involves training health nurses in the early detection of depression and training them in applying the mother–baby intervention.

2. Relation between maternal sensitivity and depression

Not all depressed mothers are insensitive towards their infants. The results of our studies showed a certain variation in maternal sensitivity at pre-test. This leads to two interesting implications for practice.

First, not all depressed mothers need the mother–baby intervention. In fact, the results of the second study (Chapter 3) implied that even chronically depressed mothers with comorbidity are able to be sensitive towards their child, as long as there are protective factors present such as a feeling of competence as a parent, a reasonable educational level and sufficient family income. Therefore, depressed mothers with infants need to be screened for their level of maternal sensitivity by an observation of mother–child interaction before it is decided whether the intervention should be offered or not. According to the EAS sensitivity scale used in the present thesis, as well as the widely used Ainsworth sensitivity scale

(Ainsworth, Blehar, Waters & Wall, 1978), maternal sensitivity is, by definition, 'good enough' if scores exceed 6.
Second, the screening should also be aimed at identifying subgroups of mothers at special risk for developing low maternal sensitivity, e.g. young mothers with high levels of depressive symptoms, low-income mothers with serious feelings of parental incompetence and depressed mothers with more than four risk factors. We recommend offering the intervention to all teenage and young adult mothers suffering from depression. In one municipality in the Netherlands, the intervention is already part of the routine in a home for teenage mothers. The intervention could be offered especially to depressed mothers facing additional risks.
Finally, depressed mothers with high levels of life stress showed less average improvement in sensitivity during the intervention. We recommend applying a specially tailored approach, for example by screening the mothers´ level of life stress before offering the mother–baby intervention. In the case of high levels of life stress, the mother–baby intervention could be offered at a later stage. Further research is needed to improve the screening to identify depressed mothers who can benefit most from the mother-baby intervention.

3. Research and practice

Although the study was successful, it took a long time to recruit a sample of depressed mothers and babies large enough for the randomized controlled trial. We had to put in a great deal of effort to reach the mothers, and the enrolment period had to be prolonged: instead of the intended 2 years we ended up needing 3.5 years. As a research group, we were dependent on referrals by therapists in adult mental health care, who had to explain the study and the randomized design to their potential candidates. This was not an easy task for them, as they did not want to impose an extra burden on the families, in view of their already difficult situation. Another problem hampering the recruitment of mothers for the RCT was the implementation of the intervention in the many mental health centres. Based on their previous experience with it, the mental health workers were convinced of the efficacy of the intervention in practice, and they were reluctant to refer mothers to a trial that could assign them to the control group and thereby withhold from them this important intervention. In the end, we succeeded in recruiting a sufficient number of depressed mothers (n = 84 at pre-test) by using several additional promotion activities, such as advertisements in local newspapers, announcements on websites for parents and articles about postpartum depression in magazines for parents. Subsequently, a brochure was produced explaining the study, to support the therapists in motivating their patients to participate, while the contact persons at eight mental health centres (usually the centre's prevention

expert) were supported by optimizing the recruitment strategy at their centre. These problems also necessitated applications for additional grants. Despite all the recruitment problems that may be encountered, however, conducting randomized controlled trials in practice is necessary to test the efficacy of preventive and other interventions and for the further development of evidenced-bases prevention programmes.

4. Implications for the mother–baby intervention

This thesis showed that the mother–baby intervention – a short, moderately intensive intervention – can achieve a significant and relatively long-term favourable effect (at least 6 months after the intervention) on the quality of the mother–child interaction and on the children's attachment security and socio-emotional competence in a sensitive period of their development. Importantly, the attachment security scores of the children in the intervention group turned out to be as high as those for children in normal populations. If these scores can be attributed to the mother's participation in the intervention, then this offers a better chance to protect children from problematic development. These results strongly suggest that the children in the intervention group are better protected against developing problems than children of mothers who do not participate in the intervention programme.

In view of these results, no essential changes in the content and format of the intervention are being considered. However, some adaptations should made in terms of the targeting of depressed mothers. The current results showed that screening for risk and protective factors (including high life stress) or observing the level of maternal sensitivity is needed before offering the mother–baby intervention.

Although we are thus currently not considering any essential changes in the content and format of the intervention programme, the results of a follow-up study when the children are five years old might lead to these implications being re-considered.

5. Limitations and challenges for the future

The research reported on in the present thesis aimed to examine the effectiveness of a mother–baby intervention for depressed mothers and their infants. Although the studies yielded many interesting and promising results, it is important to consider the limitations described in the discussion sections of the four chapters on these studies. Therefore, the most important limitations are pointed out once more in this summary. First, the sample size (n = 71) at follow-up of participants who had completed all three measurements was relatively small, enabling the

likelihood of Type II error (Cook & Campbell, 1979). Finding subgroups that benefit the most was impossible, because of this power problem, i.e., the limited number of participants in the intervention group (n = 35), or because there was not enough variance in the sample of our study to detect significant differences. The second limitation is that the follow-up assessment six months after the intervention may have come too early for any intervention effects on the children's socio-emotional problems to have become manifest. For example, we failed to find a difference between the two groups for three of the four domains of infant socio-emotional functioning (externalizing, internalizing and dysregulation). A one-year follow-up might have been more appropriate to test the treatment efficacy for these behavioural aspects. A third limitation of the research concerns the fact that the role of the father was not taken into account. Although 66% of fathers were involved in the intervention, we cannot draw any conclusions about their role in the effect of the intervention or the impact of their presence on the development of the children. A fourth limitation is that we did not screen the mothers for Axis II disorders (Personality Disorders, DSM IV, APA 1994). The frequent comorbidity of depression and borderline personality disorder needs particular attention (Stanley & Wilson, 2006), since persons with borderline personality disorders are known to be usually women (75%), and studies have shown adverse effects on child outcomes and problems in mother–child interaction (Crandell, Patrick & Hobson, 2003; Danti, Adams & Morrison, 1985; Weiss, Zelkowitz, Feldman, Heyman, & Paris, 1996). The question whether the intervention would also be effective in the case of depressed mothers with a borderline personality disorder needs further research. A fifth limitation is that the present studies yielded no data about the cost-effectiveness of the mother–baby intervention. The results of such an evaluation could convince policy makers and health insurers to support the need for long-term funding of the mother–baby intervention.

Hence, replication of the study with a larger sample and studies to see if the current intervention effects are maintained in later years will be needed to confirm the present results. Furthermore, the role of the father needs more attention and research is needed to assess whether the intervention is suitable for application in a wider group of young depressed mothers with personality disorders. Finally, a cost-effectiveness evaluation is required to compare the costs and benefits of the intervention.

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Nederlandse samenvatting en discussie

Het onderzoek, beschreven in dit proefschrift, is gericht op de effectiviteit van een vroegtijdige interventie voor depressieve moeders en hun baby's van 1 tot en met 12 maanden, de zogenaamde moeder-baby interventie. De algemene doelen van het onderzoek zijn:
(1) het onderbouwen van de moeder-baby interventie met een theoretisch model en het beschrijven van de interventie
(2) het onderzoeken of de kenmerken van een depressieve moeder en factoren in haar omgeving de mate van sensitiviteit van de moeder naar het kind toe kunnen voorspellen
(3) het bestuderen van het effect van de moeder-baby interventie en in het bijzonder het onderzoeken van het verschil in de kwaliteit van de moeder-kind interactie, de gehechtheid en het sociaal –emotioneel functioneren van het kind tussen de interventie groep en de groep die geen interventie heeft gekregen
(4) het verklaren van de verschillen tussen depressieve moeders in de ontwikkeling van hun sensitiviteit naar hun kinderen toe over een periode van tien maanden.
De gegevens in deze onderzoeken zijn afkomstig van een dataset van 84 depressieve moeders en hun baby's bij de voormeting, waarvan er uiteindelijk 71 ook deelnamen aan de nameting en follow-up meting.

Samenvatting van het onderzoeksproject

Studie 1. In hoofdstuk 2 wordt de interventie voor depressieve moeders en baby's beschreven en het theoretisch model waar het op gebaseerd is. De resultaten worden gerapporteerd uit studies naar de gevolgen die de depressie van de moeder kan hebben voor de ontwikkeling van de kinderen. Deze kinderen hebben meer kans op het ontwikkelen van psychische en sociaal-emotionele problemen. Ondanks het verhoogde risico op negatieve gevolgen voor de ontwikkeling van kinderen van depressieve moeders is het risico niet voor iedereen hetzelfde. Drie mechanismen worden verantwoordelijk geacht en kunnen een verklaring zijn van de verhoogde kans op negatieve gevolgen bij deze kinderen:
- de vroege moeder-kind interactie
- prenatale neurobiologische overdracht
- het genetische mechanisme van overdracht

De moeder-kind interactie van depressieve moeders onderscheidt zich in verschillende opzichten met die van gezonde moeders. De interactie van depressieve moeders met hun baby wordt gekenmerkt door minder expressiviteit en een sombere uitstraling. Ook zijn deze moeders vaker intrusief (indringend,

storend), minder emotioneel betrokken, niet responsief en minder gevoelig voor de signalen van het kind. De moeder-baby interventie is gebaseerd op een transactioneel model waarbij de moeder-kind interactie een sleutelrol heeft in de verklaring voor de ontwikkeling van sociaal-emotionele problemen bij kinderen. Het model bestaat uit een aantal wetenschappelijk bewezen risicofactoren bij de ouder, het kind en de omgeving die van invloed zijn op de interacties tussen depressieve moeders en hun kinderen en die een bijdrage leveren aan zowel de kwetsbaarheid als de weerbaarheid van de kinderen als zij opgroeien.
De moeder-baby interventie bestaat uit 8 tot 10 huisbezoeken. Een preventiewerker, psycholoog of sociaal psychiatrische verpleegkundige (getraind in de interventie) bezoekt de depressieve moeder en haar baby thuis. Er worden video-opnamen gemaakt van een moeder-baby interactie, bijvoorbeeld als moeder haar kindje in bad doet of een spelsituatie. Een multidisciplinair team bestaande uit hulpverleners, verbonden aan een GGZ-instelling[3] die ervaring hebben in het werken met baby's, analyseren de video-opname. Hierbij letten ze met name op hoe sensitief de moeder reageert op de signalen en behoeften van het kind. Op basis van de observatie formuleert het team de doelen van de interventie. Deze doelen kunnen bijvoorbeeld het versterken van sensitiviteit van de moeder voor signalen van haar kind of het verminderen van storend gedrag van de moeder naar haar kind zijn. Vervolgens kiest de preventiewerker de methoden die het beste passen bij de doelstelling en zijn afgestemd op de behoeften van de moeder. Samen met de ouders wordt vastgesteld hoe de communicatie tussen moeder en baby verbeterd kan worden. Aan de hand van de video-opnamen kunnen de ouders zien hoe je kunt reageren op oogcontact, beweging en geluidjes van de baby. De vader, indien aanwezig, wordt gestimuleerd zijn vrouw te ondersteunen in de interactie met haar kind. Naast de video-observaties, het terugkijken en bespreken ervan kunnen nog andere methoden worden gebruikt, afhankelijk van de behoeften van de ouders: voorbeeld gedrag (modeling), baby massage en praktische opvoedingsondersteuning.
De moeder-baby interventie is recentelijk geïmplementeerd in ongeveer de helft van de ambulante GGZ-instellingen als onderdeel van het preventieve KOPP-programma. Dit programma is gericht op het voorkomen van psychische en sociale problemen van kinderen van ouders met psychiatrische problemen.

Studie 2. De tweede studie bestudeert in welke mate verschillende kenmerken van moeder, kind, de omgeving en het aantal aanwezige risicofactoren, de sensitiviteit bij de depressieve moeders kan voorspellen. Deze studie is verricht bij de voormeting, voor de start van de moeder-baby interventie (Hoofdstuk 3). De onderzoeksgroep

3 *Geestelijke Gezondheidszorg-instelling*

bestond uit 84 depressieve moeders met een baby niet ouder dan 12 maanden. Er werd een video-opname gemaakt van de moeder tijdens het in bad doen van haar baby (± 15 minuten). De opnamen werden gescoord met de Emotional Availability Scales (Biringen, Robinson & Emde, 1998) door drie onderzoekers. Drie kenmerken droegen onafhankelijk bij aan de variantie in sensitiviteit van moeder:

- het opleidingsniveau van moeder
- gevoelens van ouderlijke incompetentie
- het gezinsinkomen

Daarnaast werden er twee subgroepen van depressieve moeders gevonden die met name een verhoogd risico hebben op een lage sensitiviteit. Het gaat hier om jonge moeders met ernstige depressieve symptomen en moeders met een laag inkomen die zich onzeker voelen over hun competentie als ouder. Samen verklaarden deze factoren onafhankelijk 23% van de variantie in de sensitiviteit bij de onderzochte groep depressieve moeders. De aanwezigheid van meerdere risicofactoren verklaarde 9.9% van de variantie in de sensitiviteit.

De resultaten hebben implicaties voor preventieve interventies. Het vroegtijdig opsporen van de moeders met een verhoogd risico op een lage sensitiviteit kan bijdragen tot positieve resultaten. De preventieve interventies zijn dan gericht op het verhogen van de sensitiviteit bij depressieve moeders en het versterken van de ouderlijke competentie. De resultaten laten zien dat chronisch depressieve moeders met comorbiditeit in staat zijn sensitief te reageren zolang er beschermende factoren aanwezig zijn. Bijvoorbeeld het gevoel hebben een competent ouder te zijn, een redelijk opleidingsniveau en voldoende gezinsinkomen.

Studie 3. In de derde studie (Hoofdstuk 4) is onderzocht of de moeder-baby interventie bij depressieve moeders en baby's tot en met 12 maanden een positief effect heeft op de kwaliteit van de moeder-kind interactie, de mate van veilige gehechtheid van het kind en het sociaal- emotioneel functioneren van het kind. In een gerandomiseerd onderzoek werd een experimentele groep (n = 35) die de interventie kreeg aangeboden vergeleken met een controlegroep (n = *36).* De controlegroep kreeg opvoedingsadviezen per telefoon (3 korte telefonische contacten met een jeugdhulpverlener).

In de experimentele groep trad een significante verbetering op in de sensitiviteit van moeder *(p =0.001),* de responsiviteit (p= 0.01) en betrokkenheid (p=0.01) van het kind naar moeder toe, vergeleken met de controlegroep. Een follow-up meting zes maanden na het einde van de interventie liet zien dat het verschil tussen experimentele en controlegroep ten aanzien van de kwaliteit moeder-kind interactie stand hield. Ook was bij deze meting te zien dat kinderen uit de experimentele groep significant veiliger gehecht zijn en meer sociaal-emotioneel

competent, vergeleken met de controlegroep. De resultaten tonen aan dat de moeder-baby interventie succesvol is in het voorkomen van vroegtijdige moeder-kind relatieproblemen. Als er in de moeder-kind relatie problemen optreden, wordt aangenomen dat deze een belangrijke risicofactor vormen voor het ontwikkelen van psychopathologie bij kinderen en volwassenen. Deze studie laat zien dat met een korte en redelijk intensieve interventie een significant en relatief lange-termijn preventie effect (6 maanden na het einde van de interventie) bereikt kan worden in een cruciale ontwikkelingsperiode van een kind. De sensitiviteit van de moeder verbeterde sterk na de interventie. Dit is een van de belangrijkste kenmerken van goed ouderschap en een belangrijke voorspeller van positieve effecten voor kinderen.
Opvallend is dat de interventie niet heeft bijgedragen aan het verminderen van de depressie bij moeder. Dit ondanks de afname in depressieve symptomen in beide groepen, vergeleken met de score op de voormeting. Het effect van de individuele behandeling van de moeders voor hun depressie in beide groepen zou het effect van het verminderen van de depressie door de interventie mogelijk kunnen maskeren.

Studie 4. Voor het verbeteren van de effectiviteit van preventieve interventies en de voorwaarden waaronder de interventies het meest effectief zijn, is identificatie van voorspellers van het effect (effect predictoren) nodig. In deze laatste studie (Hoofdstuk 5) worden de kenmerken van de proefpersonen bij de voormeting (pretest) gebruikt in het voorspellen van veranderingen in de sensitiviteit van de depressieve moeders met een baby over een periode van tien maanden. De onderzoeksgroep bestond uit 71 depressieve moeders met baby's die hebben deelgenomen aan de effectstudie van de moeder-baby interventie (zie Hoofdstuk 4). Elf kenmerken van de onderzoeksgroep, aanwezig bij de voormeting, werden geïdentificeerd als mogelijke predictoren van het effect van de interventie. Het aantal factoren is gereduceerd door middel van een principale factoranalyse op deze elf kenmerken. De factoranalyse resulteerde in drie factoren, 'ongunstige demografische kenmerken van moeder', 'depressie gerelateerde risicofactoren' en 'levensstress'. De drie factoren werden gebruikt als predictoren in een hiërarchische regressie analyse om de verandering van de sensitiviteit van de moeder tussen voormeting en follow-up meting te voorspellen. Samen voorspelden deze drie factoren 14,9% van de verandering in de sensitiviteit. Hoe hoger het depressie gerelateerd risico en hoe meer ongunstige demografische kenmerken, hoe meer verandering van de sensitiviteit. Uit de resultaten van de effectstudie bleek dat de sensitiviteit in de experimentele groep verbeterde en verminderde in de controlegroep Dit kan er op wijzen dat moeders die deelnamen aan de interventie met een hoog depressie gerelateerd risico en ongunstige demografische

kenmerken meer vooruit gingen in de sensitiviteit . En voor de groep moeders die geen interventie kregen in dezelfde omstandigheden, wijst het er op dat de sensitiviteit juist verder achteruit ging.
Daarnaast bleek dat veel blootstelling aan stress negatieve invloed had op de verandering van sensitiviteit. Dit betrof zowel de experimentele als de controlegroep. In tegenstelling tot onze verwachting bleken moeders met een hoger stressniveau minder vooruitgang in de experimentele groep te boeken en gemiddeld relatief meer achteruitgang in de controlegroep. Deze resultaten kunnen belangrijke implicaties hebben voor preventieve interventies. Er wordt een voorstel gedaan voor aangepaste interventie voor depressieve moeders die een hoog stressniveau ervaren.

Slotopmerkingen

De onderzoeken, beschreven in dit proefschrift, hebben nieuwe en interessante resultaten opgeleverd over de effectiviteit van een vroegtijdige preventieve interventie voor depressieve moeders en hun baby's en over mogelijke voorspellers van de mate van sensitiviteit bij depressieve moeders. Uit de resultaten van de vier studies komen nog een vijftal slotconclusies naar voren over de het belang van deze studie, de verdere ontwikkeling van preventie als wetenschap en over de klinische implicaties voor de preventiepraktijk.

1. Implementatie van de moeder-baby interventie en verder onderzoek

Dit was de eerste gerandomiseerde studie in Nederland naar het effect van een preventieve interventie voor depressieve moeders en hun baby's. Ten eerste moet worden benadrukt dat, hoewel de positieve resultaten stand houden tot zes maanden na de interventie, de huidige onderzoeksgroep gevolgd moet worden om na te gaan of de effecten van de interventie ook blijven bestaan na een aantal jaren. In 2005 is een vervolgonderzoek gestart bij dezelfde onderzoeksgroep waarvan de kinderen nu 5 jaar zijn. Hoewel replicatie van de huidige studie nodig is in de toekomst en er nog geen lange termijn effecten bekend zijn, ondersteunen de gunstige resultaten van dit onderzoek de implementatie die op dit moment op grote schaal plaatsvindt in Nederland en ook in andere landen. Ongeveer 50% (ongeveer 20) GGZ-instellingen in Nederland bieden de interventie aan. De verwachting is dat andere instellingen zullen volgen in toekomst.
Ondanks deze veelbelovende resultaten betreffende de implementatie en het effect, is het aantal depressieve moeders met baby's die de interventie aangeboden krijgen relatief klein. In 2005 namen ongeveer 400 depressieve moeders landelijk deel aan de interventie. In het licht van het totale aantal depressieve moeders met een baby jonger dan 1 jaar (een schatting van 20.000 per jaar) is dit getal

maar een fractie van het grote geheel. De GGZ-instellingen bereiken met name de moeders die al ernstig depressief zijn, deze moeders wachten relatief lang met hulp vragen voor hun depressieve klachten. Sommige vrouwen vertellen niemand iets over hun sombere klachten omdat ze zich schamen of schuldig voelen over hun depressieve gevoelens in een periode waarin van hen verwacht wordt dat ze gelukkig zijn. Een bredere toepassing in de Jeugd Gezondheidszorg 0-4 jaar (JGZ, consultatiebureau's) waar in principe alle Nederlandse moeders naar toegaan met hun baby's, kan het bereik van het aantal moeders in een eerder stadium aanzienlijk vergroten. De eerste stappen zijn gezet om als proef de moeder-baby interventie te implementeren bij JGZ-instellingen in drie regio's. Het plan houdt in het trainen van JGZ-verpleegkundigen in het vroegtijdig opsporen van depressie bij de moeders en training in het uitvoeren van de moeder-baby interventie.

2. Relatie tussen sensitiviteit van de moeder en depressie

Niet alle depressieve moeders zijn insensitief in de interactie met hun kind. De resultaten van de onderzoeken laten een variantie in sensitiviteit bij de moeder zien bij de voormeting. Dit resulteert in twee interessante implicaties voor de praktijk.

Ten eerste: niet alle depressieve moeders met een baby hebben de interventie nodig. De resultaten van de tweede studie (Hoofdstuk 3) impliceren dat ook, zelfs moeders met een chronische depressieve en/of een comorbide stoornis zijn in staat sensitief te reageren op hun kind. Mits er beschermende factoren aanwezig zijn, zoals zich competent voelen als ouder, een redelijk opleidingsniveau en voldoende gezinsinkomen. Voordat besloten wordt of de interventie aangeboden wordt, is het dus aan te raden depressieve moeders met een baby te screenen op de mate van sensitiviteit. Dit kan door middel van een observatie van de moeder-kind interactie. Voor zowel de sensitiviteitsschaal van de Emotional Availability Scales (Biringen, et al, 1998) gebruikt in dit proefschrift, als de sensitiviteitsschaal van Ainsworth (Ainsworth, Blehar, Waters & Wall, 1978), is een score van 6 of hoger 'goed genoeg' wat betreft sensitiviteit van de moeder.

Ten tweede: het screenen van deelnemers aan de interventie zou gericht moeten zijn op opsporen van subgroepen moeders die een verhoogd risico hebben op een lage sensitiviteitsscore. Dit zijn jonge moeders met ernstige depressieve symptomen, moeders met een laag inkomen en zich onzeker voelen over hun competentie als ouder en depressieve moeders met meer dan vier risicofactoren tegelijkertijd. Wij adviseren de interventie aan te bieden aan alle tienermoeders en jongvolwassen moeders die een depressie hebben. In een van de GGZ-regio's in Nederland wordt de interventie al aangeboden als onderdeel van de begeleiding in de opvang van tienermoeders met hun baby's. Ook raden we aan de interventie

aan voor depressieve moeders met meerdere risicofactoren.
Tenslotte: depressieve moeders met een hoge mate van stress laten minder vooruitgang zien in sensitiviteit als gevolg van de moeder-baby interventie. Wij stellen een aangepaste benadering voor, bijvoorbeeld het screenen van potentiële deelnemers op het stress-niveau. In het geval van een hoog stressniveau zou de interventie later aangeboden kunnen worden, wanneer de stress is verminderd door de individuele behandeling van de moeder. Verder onderzoek is nodig om de screening te verbeteren, teneinde die moeders op te sporen die het meeste profijt kunnen hebben van de interventie.

3. Onderzoek en praktijk

Hoewel het onderzoek een groot succes is geworden, heeft het lang geduurd om de grootte van de onderzoeksgroep op het niveau te krijgen dat vereist is voor een gerandomiseerd onderzoek. Er is veel tijd en geld geïnvesteerd om voldoende moeders te bereiken. De wervingsperiode moest worden verlengd, in plaats van de geplande 2 jaren waren er 3,5 jaren nodig. Als research groep waren we afhankelijk van de verwijzing van therapeuten en behandelaren van volwassenenzorg in de GGZ. Zij gaven uitleg aan de potentiële kandidaten over het onderzoek en het gerandomiseerde design (50% kans op de interventie of telefonische ondersteuning). Dit was geen gemakkelijke taak voor ze, zij wilden de gezinnen die zich al in een moeilijke situatie bevonden niet extra belasten. Een ander probleem bij de werving voor het onderzoek was dat de moeder-baby interventie al was geïmplementeerd in de instellingen die meededen aan het onderzoek. Gebaseerd op hun ervaring met de interventie waren de hulpverleners al overtuigd van het effect van interventie. Ze voelden zich bezwaard de moeders te informeren over het onderzoek met de kans dat ze dan in de controlegroep terecht zouden komen en ze deze belangrijke interventie onthouden zou worden. Uiteindelijk is het gelukt om voldoende depressieve moeders (N=84 bij de voormeting) te werven door middel van verschillende extra pr-activiteiten zoals advertenties in regionale kranten, aankondigingen op websites voor ouders en artikelen over post-partum depressie in tijdschriften voor ouders. Ook is er een folder ontwikkeld waarin het onderzoek wordt uitgelegd en die therapeuten gebruikten om hun cliënten te motiveren voor deelname. En de acht contactpersonen van de aan het onderzoek deelnemende GGZ-instellingen werden ondersteund om de werving te verbeteren. Door deze problemen en pr-acties was er ook extra geld nodig. Daarvoor zijn nieuwe subsidies aangevraagd. Ondanks alle wervingsproblemen die we zijn tegengekomen, blijft het noodzakelijk gerandomiseerd onderzoek uit te voeren in de praktijk om het effect aan te tonen van preventieve en andere interventies en voor de verdere ontwikkeling van evidence-based preventieprogramma's.

4. Implicaties voor de moeder-baby interventie

Dit proefschrift laat zien dat je met een relatief korte en intensieve interventie een significant positief effect kunt bereiken, zelfs tot 6 maanden na de interventie. Effecten zijn zichtbaar in de kwaliteit van de moeder-kind interactie, de gehechtheidsrelatie van het kind en de sociaal-emotionele competentie in gevoelige periodes in het leven van het kind. Belangrijk was dat de veiligheidsscore van de kinderen in de interventiegroep met betrekking tot de gehechtheid vergelijkbaar was met de kinderen uit normale populatie. Als deze scores kunnen worden toegewezen aan deelname van de moeder aan het interventie programma, dan biedt dit een kans om kinderen te beschermen voor een problematische ontwikkeling. Deze resultaten tonen aan dat kinderen uit de interventiegroep beter beschermd zijn tegen het ontwikkelen van problemen vergeleken met kinderen van moeders die niet hebben deelgenomen aan de interventie.

Op basis van de resultaten wordt duidelijk dat er geen essentiële veranderingen in de inhoud en de vorm van de interventie noodzakelijk zijn. Echter, er zullen wel wat aanpassingen gemaakt worden om de doelgroep wat beter af te bakenen. Het is belangrijk de deelnemers te screenen op risico en beschermende factoren en een observatie van de moeder-kind interactie is nodig voor de interventie aangeboden wordt.

Hoewel we op dit moment geen essentiële veranderingen gaan aanbrengen in de inhoud van de interventie, kan dit opnieuw overwogen worden wanneer de resultaten van het follow-up meting als de kinderen 5 jaar zijn daar aanleiding toe geven.

5. Beperkingen en uitdagingen voor de toekomst

Het onderzoek in dit proefschrift was gericht op het effect van de moeder-baby interventie voor depressieve moeders en hun baby's. Hoewel de verschillende studies interessante en veelbelovende resultaten laten zien is het van belang ook stil te staan bij de beperkingen, beschreven in de discussieparagrafen in de vier hoofdstukken over de vier studies. Daarom worden de belangrijkste beperkingen nog eens herhaald in deze samenvatting.

Ten eerste: de onderzoeksgroep (n=71) bij nameting van deelnemers die hebben meegedaan aan alle drie de metingen is relatief klein, wat de kans op een type II fout vergroot (Cook & Campbell, 1979). Het vinden van subgroepen die het meeste profijt hebben van de interventie was onmogelijk door het kleine aantal deelnemers in de interventiegroep *(n=35)*, of omdat er niet genoeg variatie in de onderzoeksgroep van deze studie was om significante verschillen te vinden. De tweede beperking is dat de follow-up meting, 6 maanden na het einde van de interventie, te kort is geweest om effecten van de interventie te vinden op sociaal-emotionele

problemen bij de kinderen (externaliserend, internaliserend en disregulerend gedrag). Een tweede folllow-up na een jaar zou mogelijk meer opgeleverd hebben wat betreft het effect van de interventie op deze gedragsaspecten. Een derde beperking van dit onderzoek is dat de rol van de vader niet mee is genomen in het onderzoek. Hoewel 66% van de vaders was betrokken bij de interventie, kunnen we geen enkele conclusie trekken over de invloed van hun aanwezigheid voor de ontwikkeling van de kinderen. Een vierde beperking is dat we moeders niet hebben gescreend voor een As II problematiek (Persoonlijkheidsstoornissen volgens de DSM IV, APA, 1994). De vaak voorkomende comorbiditeit van depressie met een borderline persoonlijkheidsstoornis heeft speciaal aandacht nodig (Stanley & Wilson, 2006). Mensen met een borderline stoornis zijn vaak vrouwen (75%) en onderzoek laat zien dat er veel problemen zijn in de moeder-kind interactie, waardoor de gevolgen voor kinderen vaak ernstig zijn (Crandell, Patrick & Hobson, 2003; Danti, Adams & Morrison, 1985; Weiss, Zelkowitz, Feldman, Heyman, & Paris, 1996). De vraag of de interventie ook effectief is bij depressieve moeders met een borderline persoonlijkheidsstoornis moet verder worden onderzocht. Een vijfde beperking is dat er in de huidige onderzoeken geen gegevens beschikbaar zijn over kosteneffectiviteit van de moeder-baby interventie. De resultaten van een dergelijke analyse kunnen beleidsmakers en ziektekostenverzekeraars overtuigen van de noodzaak om te investeren in lange termijn financiering van de moeder-baby interventie.

Samengevat: replicatie van deze studie met een grotere onderzoeksgroep en nagaan of de gevonden effecten standhouden op langere termijn is nodig om de gevonden resultaten te bevestigen. Ook de rol van de vader verdient meer aandacht en de vraag of de interventie bruikbaar is voor een bredere implementatie bij een groep van jonge depressieve moeders met een borderline stoornis. Tot slot is een kosteneffectiviteits-analyse nodig om de kosten en de baten van de moeder-baby interventie te vergelijken.

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4 GGZ-Drenthe, Spatie, Altrecht, Parnassia, RIAGG Midden-Limburg, GGZ Delfland, RIAGG Rijnmond-Zuid

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Over de auteur

Karin van Doesum werd geboren op 7 mei 1961 te Kapelle Biezelinge. Na haar HAVO-diploma aan het Nederrijn College te Arnhem studeerde ze in 1983 af aan de Sociale Academie te Arnhem richting Maatschappelijk werk. Daarna begon ze haar studie Psychologie aan de Radboud Universiteit Nijmegen (specialisatie Klinische Psychologie) die zij afrondde in 1989. Haar scriptie, uitgegeven in boekvorm, was de eerste publicatie in Nederland over Kinderen van Ouders met Psychiatrische Problemen (KOPP). Na haar studie werkte ze 2,5 jaar bij de RIAGG Arnhem, eerst als psychologe bij het Adolescententeam en daarna als preventiefunctionaris bij de afdeling Preventie. Sinds 1991 werkt ze bij RIAGG IJsselland in Deventer als preventiefunctionaris. Hoofdthema is voor haar het preventieprogramma Kinderen van Ouders met Psychiatrische Problemen (KOPP). Dit onderwerp vormt een rode draad in haar carrière en inmiddels staan er al een tiental publicaties over dit onderwerp op haar naam. De moeder-baby interventie, onderzocht in dit proefschrift, is een onderdeel van het KOPP-programma. Samen met collega Carla Brok heeft zij dit ontwikkeld. In 1999 begon ze als part-time onderzoeker bij het Prevention Research Center van de Radboud Universiteit Nijmegen met het promotieproject waar dit proefschrift het resultaat van is. Na de afronding van het promotieproject blijft ze werkzaam bij het RIAGG IJsselland waar ze sinds 2002 teamleider is van het team Preventie, locatie Deventer. Ook blijft ze voor één dag in de week als onderzoeker verbonden aan de Radboud Universiteit Nijmegen waar momenteel drie onderzoeken lopen naar het effect van preventieve interventies voor kinderen van ouders met psychiatrische problemen. Tevens zet ze haar deskundigheid in bij de ontwikkeling van een preventie-unit bij RBUP-Nord (een regionaal centrum voor psychische gezondheid bij kinderen en adolescenten regio Noord-Noorwegen) en de Universiteit in Tromsø te Noorwegen.

Stellingen behorend bij het proefschrift van Karin van Doesum

An early preventive intervention for depressed mothers and their infants, its efficacy and predictors of maternal sensitivity

1. Alle depressieve moeders zijn in principe sensitief voor de signalen van de baby, echter de depressie kan dit aangeboren moederinstinct overschaduwen (dit proefschrift).

2. Behandeling van de depressie van de moeder is niet genoeg om de kwaliteit van de moeder-kind interactie te herstellen maar de moeder-baby interventie zonder de behandeling van depressie heeft ook geen effect (dit proefschrift).

3. Alle moeders met jonge kinderen hebben baat bij de moeder-baby interventie zodat het kind een veilige band opbouwt met de moeder (dit proefschrift).

4. De moeder-baby interventie kan in de toekomst worden uitgevoerd via internet en een webcam.

5. Contact met anderen maakt gelukkig maar gaat niet vanzelf.

6. Liefdevolle interactie tussen ouder en kind (sensitiviteit), is kunstmest voor een gezonde ontwikkeling van hersenen bij baby's (tijdschrift Psychologie oktober 2007).

7. De roze wolk bestaat niet.

8. De invloed van vaders met een depressie op de ontwikkeling van baby's is vergelijkbaar met de invloed van een moeder met een depressie maar is tot nu toe nauwelijks onderzocht.

9. Het eeuwig opkomen voor preventie in de GGZ houd je alleen vol met passie voor het vak, enthousiasme en humor.

10. Preventie in de GGZ zal nooit een vanzelfsprekend onderdeel worden van de gezondheidszorg als het effect ervan niet is bewezen.

11. Uitgebreide investering in preventie bij de algemene gezondheidszorg heeft zijn nut bewezen, dit staat in schril contrast met het relatief kleine bedrag wat beschikbaar is voor preventie van psychische aandoeningen. Zeker met de wetenschap dat depressie in 2020 volksziekte nummer één wordt volgens de World Health Organisation.

12. Concurreren in de geestelijke gezondheidszorg gaat ten koste van de (preventieve) zorg voor cliënten en is dus 'Klink'klare onzin.

13. De jaarlijkse intocht van Sinterklaas in Deventer op 5 december (gemeentelijke politieverordening) betreft de enige echte.